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# Railway Age

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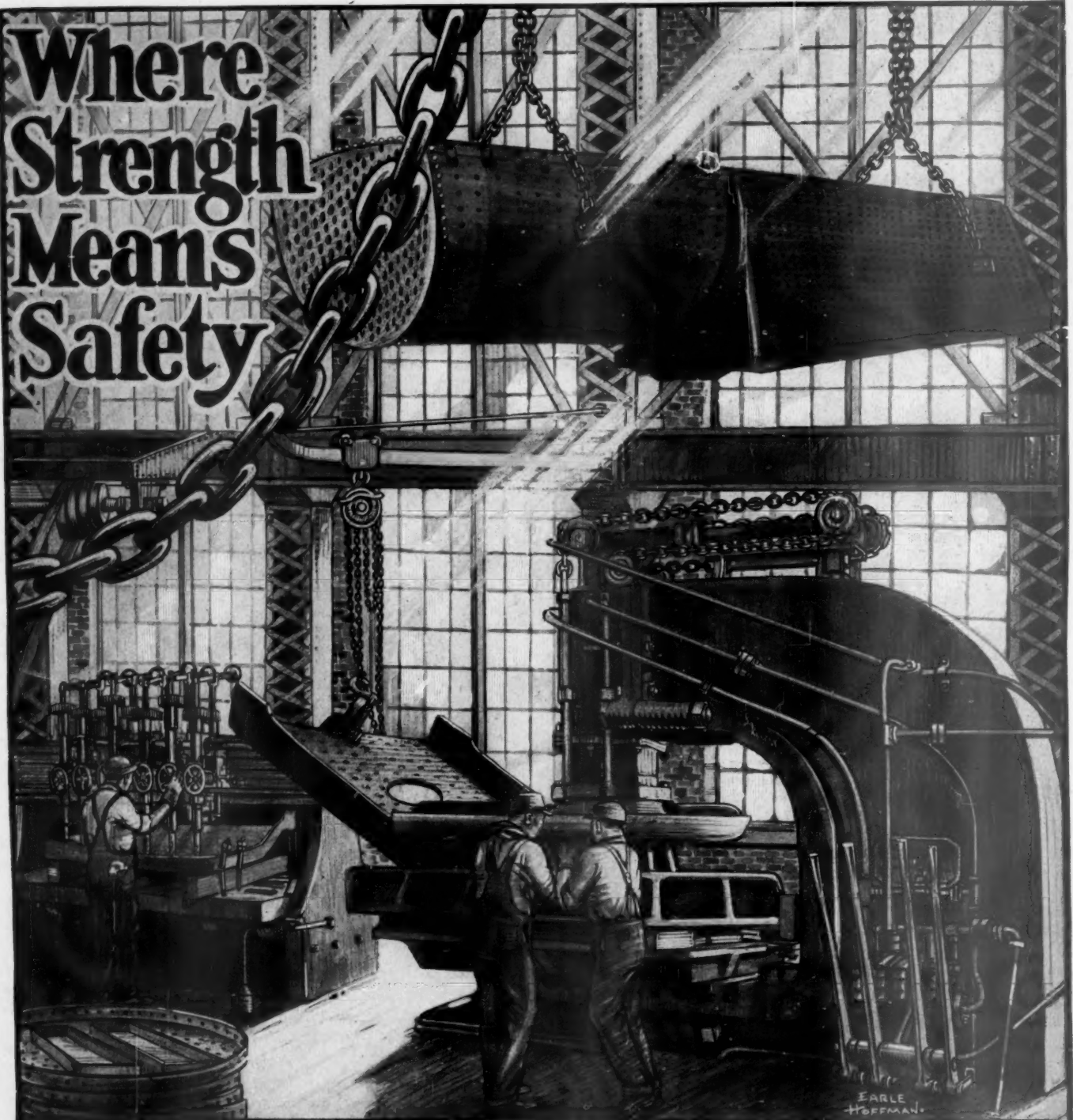
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# EDITORIAL

## Railway Age

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### The Needs of the Railways

THE PRESENT ISSUE of the *Railway Age* is devoted principally to the presentation of information intended to demonstrate and emphasize the present needs of the railways of the United States. Any presentation of the needs of the railways necessarily involves a presentation of the transportation needs of the American public, for whatever the railways really and legitimately need is something which they require in order to be able to render good, adequate and economical service to the public. President Wilson has issued a proclamation returning the railways to private management on March 1. The needs of the railways, in so far as they are needs which affect the rendering of service, are intimately connected with their requirements as regards the raising of new capital. Whether they will be able to raise adequate new capital will depend upon the kind of legislation enacted by Congress before they are returned to private operation. Therefore, all the information presented by us regarding their physical requirements is an argument for speedy and sound legislation.

This issue, aside from its news section, is roughly divisible into three sections. First, it is devoted to data showing the relative increases in the facilities of the railways and in the traffic handled prior to June 30, 1915, as compared with the increases in the traffic and the physical facilities within the last four and a half years. This information brings out strikingly the enormous deficiency of railroad facilities which has been allowed to accrue since 1915. Its demonstration of how much greater in proportion has been the increase in traffic than in the facilities provided for handling it within recent years is as striking as it is alarming. It shows clearly that the railways will be wholly unable to give satisfactory service in the near future, and that they will not be able to give satisfactory and adequate service for years to come unless there is immediately begun and carried out a program of additions, improvements and enlargements vastly exceeding any which has been carried out in the past.

Besides needing a vast increase in their facilities, the railways will have to be operated with the utmost efficiency and economy under private operation if they are to satisfy the public.

Prior to the spring of 1917 the railways were competitively operated. Under the Railroads' War Board, and subsequently under government operation, as conducted by the Railroad Administration, many new methods were

adopted to co-ordinate the facilities and operations of the railways. Some of these have been good, some bad. Some of them have been of such a character that they would be beneficial to the railways as a whole at any time, and some of them are of such a character that they would be beneficial only in periods of car shortage and congestion. The railway managements should try to distinguish between the new methods which on the return to private operation it will be desirable to abandon and those which it will be desirable to retain. Therefore, in a second section of this issue we publish a number of articles regarding new methods which have been adopted on the railways since the United States entered the war in 1917.

While data regarding the development of the railroads during periods of five or ten years is interesting, hardly less interesting and significant at any given time is information regarding developments during the immediate preceding year.

In another section of this issue we publish our usual Annual Review statistics. These statistics for the year 1919 are well worth studying. No other statistics ever published have indicated so strikingly how nearly completely the development of railroad facilities in the United States has been stopped, and therefore how essential it is that measures shall be adopted having the purpose and effect of reviving railroad expansion.

The picture of the existing railroad situation made by the presentation of the contents of this issue of the *Railway Age* is, in some respects, a gloomy one; but it is an old saying that the darkest hour of the night is just before the morning light. The very fact that the railroads are today so far behind the needs of the country makes, or should make it, clear that a period of great activity and the expansion of railroad facilities lies immediately ahead. The commerce and industry of the United States would have to stop growing if the expansion of railroad facilities were not revived on a large scale. But the commerce and industry of this country never have stopped growing, and they are not going to.

We cannot refuse to believe that the reason and selfish interest of the public are going to combine to make it see that the railroad problem must be solved; and the solution of the problem will necessarily result in a revival of railroad expansion.

## Vital Factors in the Railroad Problem

**T**HE RAILROAD PROBLEM must be solved if the material well-being of the people of the United States is to continue to increase. The increase in the material well-being of the people depends upon increase in the production of the necessities, the comforts and the luxuries of human existence. As we have repeatedly pointed out, there can be no further substantial increase of production in the United States until transportation facilities are increased; for there can be no substantial increases of production without increases of the things transported, and the railways with their present facilities are moving practically all the commerce they can. But the substantial increase of transportation facilities waits and will continue to wait upon the solution of the railroad problem. The railroad problem has a number of vital factors. Among these are:

### 1—Capital

No considerable progress can be made in the expansion of railroad facilities until a vast amount of capital can be raised for investment in railroads. The raising and investment of this capital would be necessary, if adequate facilities were to be provided, under either government management, the Plumb plan, or private management. There is no system of management conceivable under which there could be a large increase in the amount of traffic handled by the railways without a large new investment in them.

The railways are going back to private management on March 1. Therefore, the new capital must be raised and invested, if it is to be raised and invested at all, by private companies. But private companies will not be able to raise it unless they can sell large amounts of bonds and stocks; they cannot sell bonds and stocks unless they can give reasonable assurance that they will be able to pay reasonable interest and dividends upon them; they cannot give this assurance unless their net operating income will justify it; and their net operating income will not justify it unless rates are made high enough to yield an average net operating income as large as that earned by other concerns in other lines of business.

So the matter of raising capital for railroads is found, in the last analysis, to be almost entirely a question of the regulation of rates. Rates have not been fairly and wisely regulated in the past, and therefore the investment of capital in the railroads has greatly declined. Will rates be fairly and wisely regulated in the future? That will depend mainly upon the provisions of the railroad legislation which undoubtedly will be passed by Congress within the next few weeks. We believe the new legislation will provide for a marked improvement in the policy of government regulation of rates. Therefore, we believe it will result in enabling the railway companies to raise more capital than they have been able to for years.

### 2—Labor

Sufficient and efficient labor is as essential to the adequate development and efficient operation of railroads as adequate capital. If the companies can get enough capital to make needed improvements, will they be able to get enough

labor to do the work? Labor is now hard to get. The railroads have almost 200,000 more employees than they had two years ago. This is mainly due to the establishment of the eight-hour day. The amount of business being handled in proportion to the number of men employed is much smaller than it was two years ago. If it is found impracticable to get a large amount of additional labor, will it be found practicable to increase the efficiency of that now employed, thereby getting a largely increased amount of work done without a large further increase of employees?

Superficially, the present attitude of labor is not encouraging. There is complaint in all branches of industry that labor is inefficient—that it is not disposed to put its back into its work. Furthermore, the leaders of organized labor on the railroads have been opposed to returning to private operation and are advocating the Plumb plan. Besides, labor is much more generally organized on the railroads than it ever was before. Therefore, there is fear in many quarters that after private management is resumed a concerted effort will be made by labor to prevent it from being successful; and, of course, if such an effort were made it would take largely the form of a refusal on labor's part to perform its work in an efficient manner.

The problem presented is a serious one, but one whose seriousness could easily be exaggerated. The conduct of some of the principal railroad labor organizations within recent years, especially under government operation, has been such as to array against them public opinion, which formerly sided with them in their struggles with the railroad managements. The extent of the change in public opinion which has occurred is strikingly indicated by the fact that, in spite of all the denunciations and threats of the leaders of the railroad brotherhoods, a majority of the members of the United States Senate voted for the anti-strike provisions of the Cummins bill, which are much more drastic than any legislation which the railway executives ever dreamed of even suggesting. The railway legislation finally passed probably will not contain such severe provisions; but the public sentiment which they reflect will still exist; and if the railway companies show a disposition to be fair to labor a large majority of the public will side with them in any struggle which may occur. Especially would this be the case if there were reason to believe that the labor unions were making trouble in an attempt to force the country to adopt the Plumb plan; and as long as they advocate that plan every move they make will be open to that suspicion.

There are many thousands of railroad employees who are keenly conscious of the public disfavor into which the big railroad brotherhoods have fallen. There are many thousands of them who are not in favor of the Plumb plan and not opposed to a return to private operation. Many thousands more are opposed to a return to private operation only because they fear it will result in general reductions of railway wages—a fear which undoubtedly will prove to be baseless unless there shall occur radical changes in business conditions in the country which will necessitate reductions of wages in all industries. Therefore, many employees will welcome a return to private operation; and many who do not look forward with pleasure to it now will feel differently



after the change has been made; and these employees are going to do good work in future.

The efficiency of labor depends largely upon discipline, which consists of rewarding those who do good work and punishing those who do not. Good discipline will be hard to restore; but it will be much easier to administer it than it has been under government control, when it has been known that all differences arising between employees and their superiors could be appealed to bureaus and committees at Washington, and when it has been more difficult than usual to get rid of inefficient employees merely because they were inefficient.

It does not seem reasonable, and it certainly does not appear desirable, that the companies and the labor organizations should proceed upon the assumption that they are natural enemies, and that therefore their relation must permanently be those of antagonism and struggle. It is to the public interest and their own interest that they should seek a basis on which they can agree to co-operate in operating the railways and doing the improvement work needed on the railways as efficiently as possible.

Efficient production in this country is largely dependent upon efficient transportation; and the welfare of the laboring class more than any other is dependent on efficient production. The fact that they find it difficult to agree upon the division of what is produced is no good reason why labor and capital should not adopt plans of co-operation which would make as large as possible the amount of the product to be divided between them. The plans for more efficient co-operation between capital and labor should be worked out and adopted, in those fields in which labor is highly organized, by representatives of the companies and the labor organizations.

It may be regarded as asking for the millenium to suggest that labor organizations, in the interest of their own members, should exert themselves just as much to increase efficiency in transportation and production as to increase the share of what is produced which their members get; but we venture to make a prediction: Either the labor organizations will in time recognize it as a part of their function and duty to try to create efficiency in industry, or they will finally disappoint their members and destroy themselves by the methods which they are now using, which while intended to get more and more for labor, are many of them adapted to destroy the industrial efficiency upon which the real income of labor and other classes depends. Labor cannot go on forever getting more and more of what is produced, unless it will do its part in constantly increasing the amount of what is produced.

### 3—Materials

Assuming that the railways will be able to raise sufficient new capital, the problem of getting enough materials to make needed additions and improvements will be almost, if not quite, as difficult to solve as that of getting enough labor. During the war the steel mills and a large part of the other most important manufacturing plants of the country were worked to their capacity to produce things which were promptly shipped abroad and blown into the air. Meantime, building operations, the expansion of the plants of

many classes of industries, and the operation of the so-called non-essential industries were virtually suspended.

Now that the war is over there is a vast demand from other industries and from all parts of the world for materials to make up the shortage of buildings, machinery for manufacturing plants and so on, that accrued during the war. The competition is especially active for materials of the kinds so largely used by railways, such as steel and lumber. If the railroads should go into the market right now for large quantities of materials they would meet with serious delays in getting them; and they cannot go into the market at once, because they do not know the kind of legislation under which they are to be regulated in future.

It seems safe to assume, however, that the new legislation is going to be much more favorable than that to which the railways have been subject in the past. The railway companies undoubtedly should proceed upon this assumption, and begin at once making their plans for extensive improvements. Especially, they should begin at once making inquiries and placing tentative orders for materials. If they should make no moves toward getting materials before the new legislation was passed, they might find their failure to do so had entailed serious expenses and delays.

## Railway Developements in 1919

THE STATISTICS regarding railway development in the year 1919, which are given in the Annual Review section of this issue of the *Railway Age*, are in one respect at least the most striking statistics for any year which this paper ever published. They demonstrate that railway development in the United States came nearer to a dead standstill in 1919 than in any previous year since the first rail was laid in this country. The total capital expenditures made by the Railroad Administration in 1919 would not disclose this fact, because they are as large as the average annual expenditures. The fact that they were as large and that so little was accomplished with them is a striking proof of the extent to which the value of the railroad dollar has depreciated and of how much more must be expended in future years to make a given increase in railroad capacity than it has been necessary to make in past years.

In the year 1919 the total mileage of new lines built in the United States was 686 miles. This is the smallest figure which has been recorded by this paper since we began compiling the statistics of new construction in 1893. Furthermore, it does not represent a net increase in mileage. On the contrary, during the year 689 miles of main line railway in this country were abandoned for operation. Prior to the year 1915 the mileage of the country was steadily increasing, although the rate at which it was increasing had been diminishing for some years, and especially since 1910. The available statistics indicate that since 1915 the mileage of line abandoned has been greater than the new mileage. During the three years from 1917 to 1919, inclusive, our statistics indicate that operation was abandoned on 3,319 miles of line, while in the same period only 2,386 miles of extensions, branch and other new lines were completed.

Thus it appears that during the last three years there has been an actual decrease of 933 miles in the mileage of railways operated in the United States.

There was also a diminution in the construction of second, third and fourth tracks.

The statistics regarding the numbers of locomotives and cars ordered also make some striking new low records. Until this year the smallest number of freight cars ever ordered for the railways of the United States since 1901 was 62,669, this being the number ordered in 1908. In the year 1919 the number of freight cars ordered in the United States was only 22,062, and nearly all of these orders were placed by private car lines, as is shown by the fact that 15,295 of the total orders were for tank cars. The number of freight cars built for use on United States railways was much more satisfactory, being 94,981. The result, of course, of the number of freight cars built so far exceeding the number of freight cars ordered is that at the end of the year the car builders have almost no orders left upon their books.

Between the years 1901 and 1917 the number of passenger cars ordered for the railways of the United States was never less than 1,124 and ranged as high as 4,514 in 1909. In the year 1918 the number of passenger cars ordered was only 131, while in 1919 there was a small increase, the number ordered being 292. This means that in the two years of government control the number of passenger cars ordered in the United States has only been 423, which is about one-third as much as the smallest number of orders ever placed in a single year before.

The number of locomotives ordered was as low in proportion as the number of cars. The total number of locomotives ordered for railways in the United States was 214, and most of these were ordered for industrial roads. The smallest number of locomotives ever ordered in any year since 1901 was 1,182, while the largest number was 6,265. The number of locomotives built in the United States in 1919 for service in the United States was 2,055.

It is hardly necessary to make any comment on the foregoing statistics. Anybody who has any knowledge of the railroad business will at once see that the amount of new equipment actually built in 1919 was far less than the amount which is annually required for the replacement of that which must normally be retired. Furthermore, practically no provision for getting new locomotives and cars in 1919 has been made. The builders, in order to turn out a large amount of new equipment in the year, should have a large number of orders on their books on January 1. The locomotive and car builders of the United States are today practically out of orders, so far as the railways of this country are concerned.

The only thing which during the last year saved the railway supply and equipment industry from a complete collapse was orders from abroad. Foreign orders for locomotives amounted to 898 and foreign orders for freight cars amounted to 3,994. The number of locomotives built in the United States and Canada during the year to fill foreign orders was 1,110, and the number of freight cars built during the year to fill foreign orders was 61,813, only 30 of which were built by Canadian plants.

## The Plain Duty of Congress

THE AMERICAN PUBLIC has decreed that the railways shall be returned to private management. President Wilson, in obedience to the unmistakeable mandate of the public, has issued a proclamation returning the railways to the companies which own them and has fixed March 1 as the date for their return.

This settles it that the railways are to be privately managed for some years to come at least, but it does not settle how efficiently it will be possible to operate them or how good service it will be possible for them to give under private management. These things are going to be determined by Congress. Under any given set of conditions the railways of the United States probably would be more efficiently operated and give better service under private than under government management. But how efficiently they can be operated and how good service they can render under either government or private management must depend very largely on the conditions under which they are managed. The principal questions now pending as to the conditions under which they are going to be managed by the railway companies are going to be settled for some time to come by the legislation which is to be enacted by Congress before they are returned to private management.

In order that it may be practicable for the railways to be efficiently operated and give good service, they must be able to raise sufficient capital for needed improvements and additions and they must be free from constant labor disturbances and from the constant threat of labor disturbances. Whether the companies are going to be able to raise sufficient capital is going to depend almost entirely, and the extent to which they are going to be subject to labor disputes, is going to depend very largely upon what Congress does.

So far as the immediate future is concerned, what the railway companies are going to be able to do in the making of additions to and improvements in their plants is going to depend not only on what Congress does but on how soon it does it. A large program of railroad expansion should be carried out in the year 1920. The facilities of the railways in proportion to the amount of commerce demanding movement were never so inadequate as they are now. There ought to be a large increase in railway facilities within the next year. If, however, the needed legislation is not passed some weeks before March 1, the date on which the railways are to be returned, it will be impossible to make the plans, to raise the capital, to form the organizations and to get the labor and materials necessary to fairly begin carrying out a large improvement program this year. To do the most practicable good the new legislation should be enacted by February 1.

Of course, speed in passing the new legislation is far less important than the adoption of legislation of the right kind. Once Congress has passed new railroad legislation it will probably have to stand for a long time, for it will be extremely difficult for years to come to get Congress and the public to again give the attention to the railroad problem that they are giving now.

It is unfortunate that the Esch bill, which has been passed



by the House, and the Cummins bill, which has been passed by the Senate, differ widely in many important provisions. This is sure to have a tendency to delay action. If, however, Congress really is inclined to dispose of the railroad problem for some years to come, it should not find it very difficult to combine the good provisions of both bills in such a way as to make a good measure.

The most important question involved is whether Congress will adopt a new rule regarding the way in which rates shall be regulated, and, if so, what that rule will be. If the new legislation does not satisfactorily settle this question it will do little or no good. The Esch bill as originally introduced in the House contained a rule of rate-making which, while imperfect, was a substantial improvement over the rule or want of rule in the existing act to regulate commerce. The House entirely struck out this proposed rule. The Cummins bill contains a rule of rate-making which if adopted would greatly better the position of the railways, which in the past have been unable to earn an average of five and a half and six per cent on the value of their properties, but which would be no better for railways which have been able to earn approximately six per cent, and would be worse for many of the most important systems in the country which have been able to earn six per cent or more.

The minimum which the law should require is that rates must be regulated in the future with the object, among other things, of enabling the railways to raise and invest enough capital to provide facilities with which they can give good and adequate service to the public. Surely Congress and the public want rates to be so regulated. If so, there is nothing that can possibly be lost and much that can possibly be gained by saying so in the law.

If, in addition, the law is to provide that the rates must be so fixed as to enable the railways as a whole to earn a minimum average of six per cent upon their combined valuation by groups and that any surplus over this earned by individual roads shall go partly to the road earning it and partly into a general railroad contingency fund, then certainly a road which earns more than six per cent should not, as provided by the Cummins bill, be practically deprived of all but one-third of its surplus earnings over, say, six per cent. The objection has been urged with great force against the provisions of the Cummins bill that it would not give to the better managed and more prosperous railways a sufficient incentive to efficient management or a sufficient opportunity to raise ample new capital on the best terms. It would be better not to provide for any specific average minimum rate than to reduce the incentive to efficient management on the part of many of the most important railway systems in the country.

The Cummins bill provides for the creation of a federal transportation board, whose principal duty it would be to study the transportation conditions of the country and make recommendations as to what should be done to improve them in the public interest. The Esch bill vests all the federal government's regulatory authority in the Interstate Commerce Commission. If no federal transportation board is to be created, then the law should require the Interstate Commerce Commission itself to act not merely as a semi-

judicial body but as one whose duty it is to constantly strive to improve the transportation situation.

The Cummins bill provides for the voluntary consolidation of the railways during a period of years, and after the termination of this period makes the consolidation of the railways into a limited number of systems compulsory. The Esch bill would permit consolidations and agreements if the federal regulating authorities regarded them as desirable, but would not make them compulsory. The federal government has in the past tried to compel the dissolution of railroad consolidations, and it is now conceded on all hands that its policy in that respect has been wrong. It is not probable that it would produce any better results by a policy of compulsory consolidation than it has in the past by its policy of compulsory dissolution of consolidations. The railways should be authorized to make such agreements and consolidations as in the opinion of some federal tribunal will not be inimical to the public interest.

Everybody seems to agree that in future, issues of railroad stocks and bonds should be regulated and that the regulatory power should be vested exclusively in some federal body. The Cummins bill gives this authority to the proposed transportation board, while the Esch bill gives it to the Interstate Commerce Commission. It is clear that the policy of exclusive federal regulation of security issues should be adopted.

No feature of railroad regulation has in the past caused worse results than the exercise by the Interstate Commerce Commission of the authority to regulate interstate rates and by state legislators and commissions of the authority to fix state rates. The minimum which any new legislation should provide is that no state shall adopt any regulation which will burden or interfere with interstate commerce, and that the federal regulating body or bodies shall be charged with the duty of nullifying all state regulations of this kind.

Under government control the railway companies have accumulated a large indebtedness to the government. To require the speedy liquidation by the companies of the part of this indebtedness which is due to investments which the government has made in the railroads would embarrass the companies seriously in raising capital for new additions and improvements. The debts of this kind which the companies owe to the government should be funded for a period of at least ten years.

In spite of the vast advances in wages which the government has made to railway employees they now are demanding vast further advances in wages. Railroad labor controversies are always likely to be settled in a way that is contrary to the public interest or to result in serious strikes. As long as no governmental machinery for settling controversies equitably is provided, and the right to strike remains unrestrained, there will be strikes.

The Cummins bill absolutely prohibits strikes on railroads and provides for a system of compulsory arbitration. The Esch bill does not prohibit strikes and provides a system for settling labor controversies which is favored only by organized labor. Under the Esch bill the boards of adjustment and the board of wages and working conditions would be composed of equal numbers of representatives of the employees and the companies, and no change in any

wages fixed or conditions of employment established by the Railroad Administration could be made except by the action of these boards. Since, for obvious reasons, the employees on the boards would never consent to reductions in wages or changes in conditions of employment which would be regarded as unfavorable to the employees, the effect would be to establish the present wages and conditions of employment as minimums. If, as probably would happen, the railway officers on these boards refused to consent to any advances in wages or changes in conditions of employment which would increase the expenses of the companies, the result would be that no decisions would be reached and that strikes would result.

It is very doubtful whether compulsory arbitration should be adopted and strikes absolutely prohibited at this time. As far as can be judged from past experience, the next step, it would seem, should be the establishment by law of boards of adjustment, composed equally of representatives of the employees and the companies, and the establishment of a board of arbitration to which appeal could be taken and on which the employees, the companies and the public would be equally represented. Strikes should be prohibited until controversies had been passed upon, first, by a board of adjustment, and, second, by the arbitration board.

If this plan would not work successfully, then probably compulsory arbitration should be the next step, although it is doubtful if any system will ever prevent strikes on railroads until the public has become more determined to prevent them than it is now. Public hostility to railway strikes is, however, much greater now than it ever was before, and it would not take many more of them to make it determined to prevent them.

Is the program outlined in the foregoing too ambitious to

be adopted by Congress within a few weeks? Is it too favorable or too unfavorable to the railroad companies or to any other class which will be affected? The answer, we think, is to be found in the reports which the Senate Committee on Interstate Commerce made to the Senate and which the House Committee on Interstate and Foreign Commerce made to the House. These two committees are composed of the members of Congress who know more about the transportation problem than perhaps all other members of Congress. They had conducted hearings and studied the railroad problem for months. Each of them drew up a bill, which it reported, and we believe there is not a single provision the adoption of which we have suggested that was not favored by a majority of the members of each of these committees, although, of course, in a somewhat different form.

The members of these committees are the transportation experts of Congress. If the members of the Conference Committee, who represent these experts, will subordinate their comparatively unimportant differences of opinion, they can agree upon and report a good railroad bill in a comparatively short time. If a majority of the members of the Senate and House will accept the known views of their own experts, a railroad law will be passed which probably will solve the railroad problem for years to come. It is the plain duty of the experts in Congress to reconcile their differences of opinion and for a majority of the members of Congress to act in accordance with the views of their own experts.

The nation does not want government ownership. It wants private ownership and management. Private ownership and management will not be able to give the nation the good, economical and adequate railroad service it wants unless Congress creates the conditions essential to making it possible.

## Director General Hines' New Year Wish

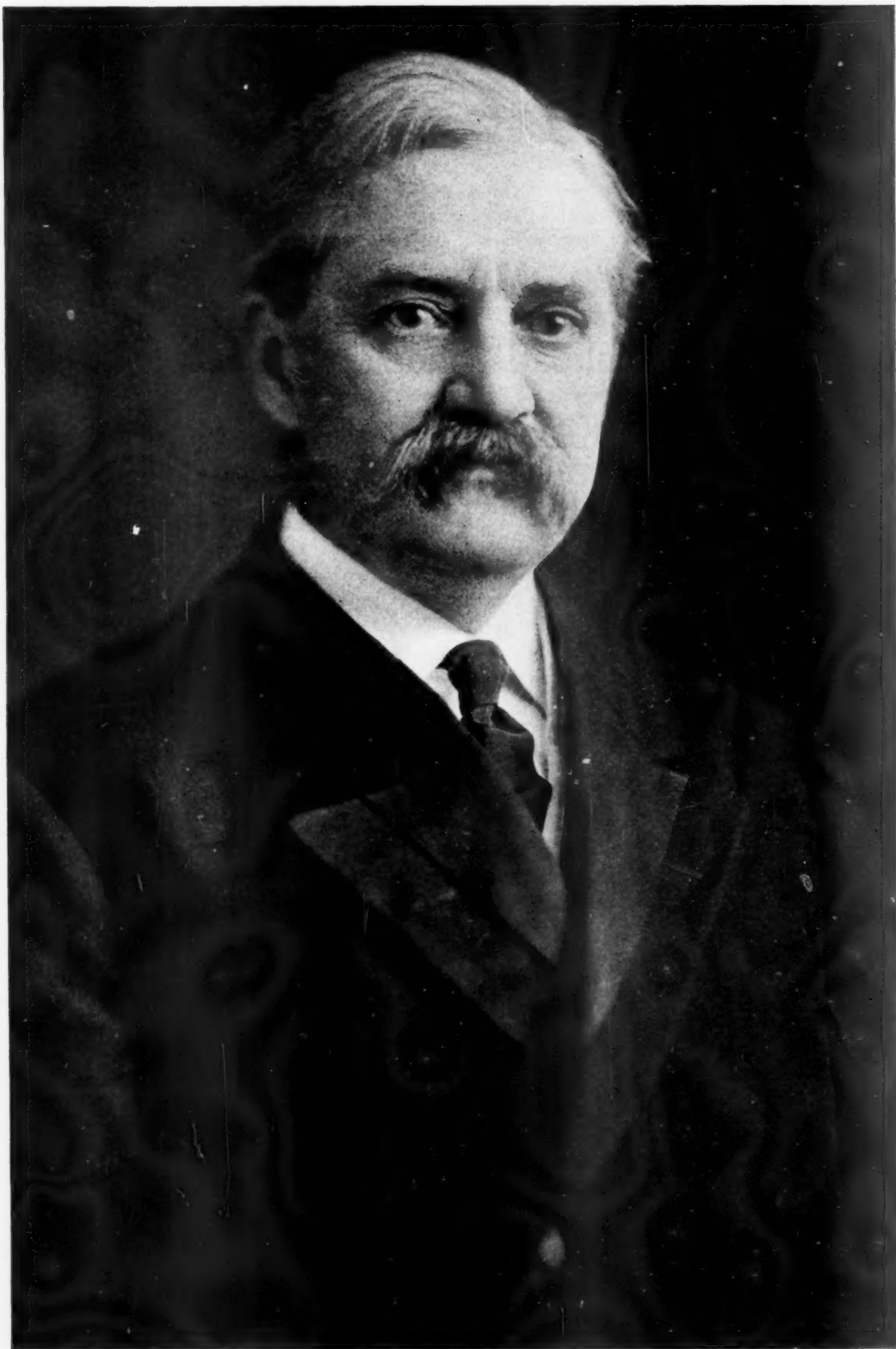
"My predominant wish for 1920 regarding public affairs is that prior to the termination of Federal control there shall be adequate railroad legislation which will be a sufficiently radical departure from the unsatisfactory railroad status prior to Federal control as to insure the continued development of railroad transportation in the public interest and the adjustment of railroad labor problems with mutual confidence and justice."



Why the  
Railroads Should Invest  
\$6,000,000,000 in New Facilities  
Within the Next Three Years

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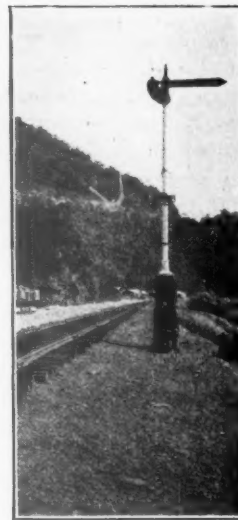
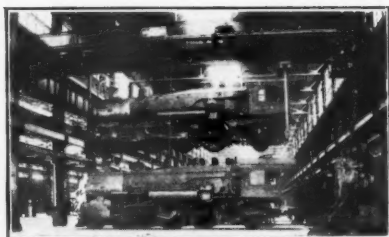
A  
Series of Articles Giving the  
Facts About the Present Railway Situation  
in Detail



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**Senator A. B. Cummings of Iowa, Chairman of the Senate Committee on Interstate Commerce**





## Six Billion Dollars for Capital Expenditures

Required Within the Next Three Years to  
Put Railways in Good Condition

**W**HAT IS THE EXTENT of the shortage of facilities for railroad transportation now existing in the United States? If there is a shortage of facilities it seems not unreasonable to assume that it should be made up during the next three years and that additional facilities should also be provided during those three years in proportion to the further growth of traffic during those years. If there is a deficiency in railroad facilities and it should be entirely made up during the next three years, what facilities would the railways have to provide and how much new capital would they have to invest in providing them?

The railways are to be returned to private operation on March 1. Congress is now deliberating upon the legislation under which they are to be returned. The kind of legislation it should enact depends in large measure upon the extent of the existing deficiency in railroad facilities and the amount of new capital which will have to be raised and invested in order to remedy that deficiency. Obviously, the larger is the amount of new capital which should be raised, the larger must be both the total amount of return and the percentage of return which the railway companies will be able to pay upon the investment in the railroad properties.

To make up a budget for a single railroad system for a single year is a very large task. To make up accurately a three-years' budget for all the railroads of the United States would be a task which would tax the knowledge and ability of the officers of all the railroads who are ordinarily assigned to making up budgets. The editorial staff of the *Railway Age* is conscious that its knowledge and ability are wholly inadequate to any such undertaking.

There are, however, available a large amount of data derived from actual past experience on which estimates of some value as to the future requirements of the railroads can be based, if the data are compiled and the reasoning on them is done by men who have a technical knowledge of

the railroad business. These data relate to the past increase of the country's population, of its freight and passenger traffic, of the increases in facilities which have been made to handle the increased traffic, and of what were the wages paid to labor and the prices paid for material and equipment in the past and of the wages which must be paid for labor and prices which must be paid for materials now and probably in future. Of course, in basing conclusions upon data

derived from past experience, certain assumptions must be made which may in future prove to have been incorrect. It must be assumed, for example, that the population will continue to increase in somewhat the same proportion as it has in preceding years; that the additional facilities required to handle a given increase in traffic would be about the same as they have been in the past, and that the amounts which these additional facilities will cost can be estimated with approximate accuracy from the present wages and prices.

If all or any of these assumptions should prove to be false, then the reasoning upon them would prove to be false. However, it does not seem logical to assume that in the railroad or any other industry in the United

States future developments are going to be entirely different from past developments, unless some different and more highly artificial influences than those which have influenced past developments, are going to influence future developments.

Taking the past experience of the United States with respect to the growth of population, industry and commerce as a basis, the editorial staff of the *Railway Age* has been engaged for some weeks in trying to make as accurate an estimate as available information makes it practicable to make, of what the existing shortage of railroad facilities of various kinds is and of what additions of facilities it would be necessary to make during the next three years in order to bring the capacity of the country's railroad transportation

### Some Things the Railways Should Acquire Within Three Years

6,000 miles of new line.  
10,850 miles of automatic block  
signals.  
13,177 locomotives.  
15,000 miles of multiple main  
tracks.  
30,000 miles of side and yard  
tracks.  
24,500 passenger train cars.  
712,400 freight cars.

Total investment needed in three  
years \$6,010,000,000.

system abreast of the reasonable demands of commerce. The data which have been compiled, the calculations which have been based upon them, and the conclusions which have been reached are set forth in a series of articles which are published in this section of the *Railway Age*.

### How Our Conclusions Were Reached

Doubtless the methods which have been used and the conclusions which have been reached are open to and will receive criticism. Some people will think that our estimates as to the needs of the railroads are too small, while others will think that they are too large. There are some interesting facts bearing upon the way our conclusions were reached, however, a recital of which may cause many persons who otherwise would be skeptical about their validity to be less skeptical about it. Some weeks ago one of the members of our staff made an estimate as to the present and future needs of the railroads, which was based upon a general consideration of the increase in investment which occurred between 1905 and 1915 and the increases in the amount of traffic handled which occurred during that period, and upon the amount of investment which had been made since 1915, the increases which had been made since then, the efficiency with which railroad facilities were utilized and the additional investment which had been made since 1915. The conclusion reached at that time was that to bring the railways abreast of the needs of the country within the three years 1920-1922, inclusive, would require a new investment of \$6,000,000,000.

When it was subsequently decided to make a detailed study of the needs of the railways, assignments to make these detailed studies in respect to the needs for additional mileage, additional trackage and permanent structures, additional freight cars, additional passenger cars, additional locomotives, additional shop equipment and additional signal installations were given to nine different members of our editorial staff. Everyone of the men to whom an assignment was given was a technically trained man who is not only familiar in a general way with the railroad business, but who had had actual railroad experience. Four of the members of our staff who prepared these articles are mechanical engineers with railroad experience, three of them are civil engineers with railroad experience and two of them are men who have had years of experience in the signal departments of railroads. Each of them compiled and dealt with data in a branch of the railroad business with which he was technically acquainted and each of them made his estimate as to what was needed in that particular field independently of all the others. The following table gives their independent estimates as to the amount of capital expenditures which should be made in the respective fields in which they made investigations:

Additional main track.....	\$1,250,000,000
Grade revision, cut-offs, elimination of curvature, etc. ....	600,000,000
Enginehouses and shops.....	250,000,000
Station buildings .....	300,000,000
Extensions .....	600,000,000
Signals .....	52,264,000
Freight cars .....	1,662,000,000
Passenger cars .....	532,000,000
Shop equipment .....	61,230,000
Locomotives .....	702,786,000
Total .....	\$6,010,280,000

It should be observed that the foregoing figures are not the estimates of the total amounts which should be spent by the railroads for new facilities during the next three years, but the total parts of what should be spent which should be charged to capital account. In other words, this estimate roughly estimates the amount of new capital which the railroads should raise and invest during the next three

years to bring their facilities abreast of the needs of American commerce. It includes nothing which should be bought for ordinary maintenance. Now, it is either a remarkable coincidence or it is highly significant that the estimate based upon general information which was made in the *Railway Age* some weeks ago was \$6,000,000,000, while the combined amount of these estimates which have been made after studies, the thoroughness of which is indicated by the series of articles published in the immediately following pages, is \$6,010,280,000.

### The Viewpoint of Railway Executives

As we have already intimated, we do not anticipate that our estimates will be accepted as even approximately accurate by all students of the railway situation. The diversity of opinion which is likely to be expressed even by those best informed is illustrated by communications from four leading railroad executives, which we publish in an article which immediately follows this one. Samuel Rea, president of the Pennsylvania Railroad, in his communication says: "I hope you will not waste your energies debating what the country needs for the developments of the next few years. Concentrate on the question of how we are going to meet the situation in 1920." Mr. Rea then points out in a few highly significant sentences the acuteness of the financial situation which exists in the United States at the present time.

L. F. Loree, president of the Delaware & Hudson and chairman of the Kansas City Southern, says in his letter: "I have no sympathy with the stupendous estimates of the expenditures necessary for the immediate needs of the railroads." He goes on and points out why he has no sympathy with them. He adds, however, "If the railroads are to assume the burden of moving, on the day, the peak of the load, of expediting the movement at the expense of loading, of warehousing in their cars the storage demands of the trades, then no multiplication of equipment, tracks or men would satisfy the demands." Mr. Loree advocates a certain policy which he believes should be adopted in order to enable the railways to handle a much larger traffic without any proportionate increase in facilities.

Julius Kruttschnitt, chairman of the Southern Pacific, says in his letter: "For the ten years ending with 1917 about \$660,000,000 has been spent annually for the construction of branches, extensions of existing lines, additional main tracks, station, yard and terminal facilities, buildings and structures, signals, roadbed, improvements, new equipment, etc. If there should be no material changes in present labor and material costs \$660,000,000, equated for existing costs will have to be spent hereafter. Index numbers of the United States Department of Labor, Bradstreet's and other authorities show that the purchasing power of the dollar at the present time is approximately one-half of what it was in the ten years preceding 1917, so that approximately \$1,320,000,000 will have to be spent to accomplish hereafter what the smaller sum did formerly." On Mr. Kruttschnitt's basis of estimating, which, however, makes no special allowance for the deficiency of railroad facilities which now exists, the capital expenditures made during the next three years by the railroads would have to be approximately \$4,000,000,000.

E. P. Ripley, chairman of the Atchison, Topeka & Santa Fe, says in his communication: "It is impossible to make an intelligent estimate of the capital necessary to rehabilitate the properties and enlarge the same to meet the demands of the country. I think your estimate of six billion dollars is not too much. I cannot speak for all roads, but feel quite sure that it would be necessary for this amount to be spent if it could be obtained, and it can be obtained only under laws which would permit the roads to retain all they earn for their own use."



### Some of the Facts on Which the Estimate is Based

We are conscious that our estimate is so large that it is more likely to be criticised on the ground that it is too large than upon the ground that it is too small. It should be borne in mind, however, that the deficiency of railroad facilities unquestionably is greater both absolutely and relatively than it was at the beginning of the year 1917. There has not been a time since the fall of 1915, except during the first months in the early part of 1919, that the railways have been able to handle all the traffic that has been offered to them, in spite of the fact that meantime they have handled a traffic which has shown a vast increase over that of preceding years. In other words, throughout this period, except during the months mentioned, the industries of the country actually did offer to the railroads more traffic than they did or could handle, and throughout 1918, when the freight traffic was slightly larger than in any other year, it was moved under a system of permits and embargoes which absolutely excluded from transportation a large amount of "non-essential commodities."

As bad as were the congestion of traffic and car shortage in the years 1906 and 1907, they were not as bad as they have been within the last three years. In 1907, however, James J. Hill estimated that in order to put the railways in shape satisfactorily to handle the commerce of the country there should be invested in them during the next five years a total of \$5,000,000,000, or \$1,000,000,000 a year. Now two billion dollars would not at present wages and prices provide any more railroad facilities than one billion dollars did in 1907. Therefore, our estimate as to what should be done per year for three years is no larger than Mr. Hill's estimate in 1907 as to what should be done per annum for five years.

The comparative conservatism will be immediately perceived by anyone who will read the detailed articles published in this section of the *Railway Age*. The new mileage of railroad lines built in the United States was never less than 2,000 miles from 1896 to 1914, and it almost always exceeded 4,000 miles, frequently exceeded 5,000 miles and in 1902 was over 6,000 miles. Our estimate provides for new construction of only 2,000 miles per year during the next three years.

### The Freight Car Situation

Our estimate as to the number of new freight cars which should be acquired within the next three years—712,400 in the United States, and about 800,000 in the United States and Canada—is based upon the indication of past experience as to the extent to which freight traffic and the average capacity of cars will increase, and as to the number of tons which it seems reasonable to assume can be carried one mile per year per ton of car capacity. The best available statistics show that since 1915 the total number of tons carried one mile per year has increased 45 per cent, while the number of freight cars owned by the railroad companies themselves has increased only 1.6 per cent. Furthermore, they indicate that there are many cars now in service which, for reasons of economy, ought to be retired as soon as practicable. Unless it is to be assumed that the freight traffic of the United States is to stop growing and begin actually decreasing our estimate regarding the number of freight cars needed now and what will be needed will, we believe, stand the test of the severest scrutiny.

### Passenger Cars and Service

Prior to recent years the railways unquestionably provided too many passenger cars and ran too many passenger trains. It would be very difficult to convince anybody who rides frequently on the passenger trains in this country that there are enough cars or trains now. The overcrowding of cars on trains throughout the country has become so great

that it is no longer possible to travel on any line handling a large passenger business with any comfort, much less pleasure. Our statistics regarding the passenger car situation bring out strikingly the reasons for this. In four and a half years passenger traffic has increased about 43 per cent, while the number of passenger cars has increased only about 2½ per cent. Between 1908 and 1916 the average number of passengers carried per car varied from 15 to 15.9. The number is now about 21, an increase since 1916 of 35 per cent. Between 1905 and 1916 the average number of passengers per train varied from 48 to 57. In 1917 it was 65, in 1918 it was 86, and now it is 90, an increase since 1916 of about 58 per cent.

Now, nobody who believes in efficient and economical railroad operation believes that the railways should ever return to the extravagant methods of handling passenger traffic which prevailed up to 1916. But it is surely not extreme to assume that under present conditions of passenger traffic they should provide enough passenger cars to handle an average of 17.6 passengers per car, which is what they did handle in 1917. While this would mean the light loading of many cars where the traffic is sparse, it would mean the heavy loading of most cars where the traffic is heavy. Our estimate as to the passenger car requirements of the railways—24,500 cars in three years—is based upon this 1917 average of 17.6 passengers per car.

### The Locomotive Situation

With respect to locomotives, passenger and freight, our estimates as to the requirements are based upon the indications of past experience as to the number of tons of freight and the number of passengers which can be expected to be carried one mile annually per pound of locomotive tractive power, under normal transportation conditions. The estimated number of new locomotives required within the next three years is 13,177.

### Block Signals Needed

Our estimates as to what should be done in the matter of installation of block signals are based entirely upon past experience. As a matter of fact this basis has been taken because it is the most conservative available, and not because we regard it as the right one. As our readers know, the *Railway Age* has for years advocated the installation of the block signal system on the entire railroad mileage of the United States, and if this were to be accomplished within any reasonable time, the rate at which signals would have to be installed would be much faster than is provided for in our estimate.

All the other estimates as to needed expenditures have been made as conservatively as any interpretation of the available data seemed to warrant. And it should be noted that the facilities which are included are by no means all those needed, but merely the principal ones. Furthermore, probably they do not include all even of the principal ones. For example, the great subject of electrification of certain classes of lines is looming more and more prominently on the horizon, and the electrification of any considerable mileage would involve vast capital expenditures although, of course, under present conditions no estimate regarding them can be made.

While the estimates we have made can be criticised in details, we believe that they are as nearly correct as any estimates that could be made regarding so vast and intricate a subject. Anybody who takes the trouble to read the following articles will hardly escape the conviction that the railways of the United States have fallen very far behind the requirements of the country within recent years, and that unless a vast program of railroad rehabilitation and expansion is begun soon, the industry, the commerce and the people of the country will suffer vast losses in consequence.



E. P. Ripley



L. F. Loree



Samuel Rea



J. Kruttschnitt

## Corporate Executives' Views on Railway Problems

### Stabilization of Railroad Credit, Adjustment of Labor Disputes and Control of Traffic Discussed

**I**N CONNECTION with the study of the requirements of the railroads which the *Railway Age* has conducted, it was desired to present the opinions of prominent railroad officers as to the problems the railroads would face in enlarging their facilities to take care of the growth of the traffic. With that purpose in view, inquiries were sent to the corporate heads of four important railroad systems. Their replies are given below:

#### Needed Capital Cannot Be Obtained If Earnings Are Limited

By E. P. Ripley

Chairman of the Board, Atchison, Topeka & Santa Fe

The limitation of earnings by law to six or seven per cent without a definite guarantee of earnings in any amount whatever will not enable the strongest roads to finance themselves, and even those having enough cash in the treasury will hesitate about putting more money into the property on such terms. In the two years of government control much depreciation has taken place, which must be made good, concerning which there will be great uncertainty and possibly protracted controversy, culminating in litigation. It is impossible to make an intelligent estimate of the capital necessary to rehabilitate the property and to enlarge it to meet the demands of the country. I think your estimate of six billion dollars is not too much. I cannot speak for all roads, but feel quite sure that the necessary amount would be spent if it could be obtained, and it can be obtained only under laws which would permit the roads to retain all they earn for their own purposes.

#### Stabilization of Credit and Settling of Labor Disputes

By J. Kruttschnitt

Chairman, Executive Committee, Southern Pacific

Before venturing an opinion as to the policy of the railroad companies in case "needed legislation" is passed, we should define "needed legislation."

All the ills that the railroads have been suffering for years

may be ascribed to a common cause—weakened credit—due to inadequate income, itself caused by inadequate rates. The railroads if restored to private operation must look to private investors for the money necessary to add to existing and to provide additional facilities for the public need.

To attract investment the credit of the carriers must be restored and firmly established by a schedule of rates that will produce revenue sufficient to pay (a) expenses of operation, including labor and taxes, (b) a fair return on the property used in the public service, (c) an additional amount sufficient to attract investment in their securities wherefrom they may be enabled to provide the service needed by the public.

If any of the things enumerated above are not necessary, which can be omitted? "Must not the expenses of operation and the taxes be paid? Must there not be a fair return, to be fixed at a reasonable figure by a governmental agency, on the property used to furnish the public with transportation? Is it not essential, in the public interest, that the carriers, comprehensively considered, shall have the credit necessary to enable them to obtain the new capital needed to furnish the facilities which the public must have?"

"And if all of these things are essential, why should Congress be reluctant to say so? And if Congress is reluctant to say so, must it not be because there is some doubt about it? If there is any doubt, why should anybody invest on the uncertainty? Is it not wise to give stability to the business of transportation by making a clear legislative declaration of the rule which will be applied and which investors may rely on? If there is any doubt about providing in the rates for any of the purposes mentioned, this is the time to say so and to give fair notice to investors. If there is no doubt there should certainly be no hesitation in so declaring."

If, in addition to the financial legislation outlined above, a plan for settling labor disputes is passed that, while giving paramount consideration to the public service, will also deal justly with the interests of labor and of capital, I believe the railroads would, as soon as possible, proceed diligently to make expenditures that would enable them to fully meet public demands.

A study of freight traffic and the corresponding expenditures for additional facilities affords a basis for estimating



future expenditures. In 1916 the increases in ton mileage from 1900 to 1915, projected into the future, indicated a probable aggregate ton mileage of the United States carriers of 345,000,000 in 1919. An estimate of the actual ton mileage for this year, based on published data for ten months, indicates a probable ton mileage of 360,000,000, or about four per cent more than an estimate made in 1916. For the ten years ending with 1917 about \$660,000,000 has been spent annually for the construction of branches, extensions of existing lines, additional main tracks; station, yard, and terminal facilities; buildings and structures, signals, roadbed improvements, new equipment, etc. If there should be no material changes in present labor and material costs, \$660,000,000 equated for existing costs will have to be spent hereafter. Index numbers of the United States Department of Labor, Bradstreet's and other authorities show that the purchasing power of a dollar at the present time is approximately one-half of what it was in the ten years preceding 1917, so that approximately \$1,320,000,000 will have to be spent to accomplish hereafter what the smaller sum did formerly. Therefore, we must not forget that the carriers' revenues must be increased \$80,000,000 annually to pay interest on these large annual outlays for additional facilities. Whether the railroads will be able to procure the necessary funds at all and, if so, whether at seven per cent, 6 per cent or 5 per cent or less, will depend on the action of Congress.

### More Intensive Use of Existing Facilities the Remedy

By L. F. Loree

President, Delaware & Hudson

My experience has been that the first recommendation that may be expected regarding a property is the suggestion of large expenditures for double-tracking and additional equipment, and that these were seldom justified and were remedies that were not calculated to cure the real disease.

I have no sympathy with the stupendous estimates of the expenditures necessary for the immediate needs of the railroads. Our general method of approaching subjects of this character is perhaps the basic fault. Consider the question of the annual crop yield. The government puts out estimates of the acreage planted, the crop conditions, the probable yield, the expected prices, and finally arrives at a figure of 9 or 12 or 15 billion dollars, as the case may be, and the average mind following these successive steps comes to feel that the ultimate result is money in the bank. Now, the fact is far from that comfortable conclusion. First must be deducted the amount fed down to the stock on the farms; then reservation must be made of seeds for the next year's planting, and with other necessary deductions there is the carry-over in the hope of higher prices, the farmer engaged in the most hazardous of our productive undertakings quite naturally extending his speculative experience into the field of values.

Very largely we build up our mental impressions and draw our conclusions in the railroad world along equally fallacious lines. If indulged in they lead to a reckless investment of capital, to an extravagant provision of facilities and to assuming the entire responsibility, when much of it properly belongs elsewhere, with the ultimate effect that the business is not prosperous and that it incurs the hostility and condemnation of those it serves.

If the railroads are to assume the burden of moving on-the-day the peak of the load; of expediting the movement at the expense of loading; of warehousing in their cars the storage demands of the trades, then no multiplication of

equipment, tracks or men will satisfy the demands. On the other hand, if, in their own interest and in that of the public, they insist on adequate reservoiring of the grain, bituminous coal, ore and kindred traffic largely seasonal in their character; the more adequate loading of cars by raising the minimums and by other devices, and such a mounting demurrage as will confine the use of the car to its transportation service, the present plant, when brought up to a proper state of repair, will be found to be reasonable, adequate and its expansion within the reasonable limits of a credit derived from rates designed to promote the growth of industry and agriculture.

### Financing Requirements in 1920 a Serious Problem

By Samuel Rea

President, Pennsylvania Railroad

I hope you will not waste your energies debating what the country needs for the developments of the next few years, but rather concentrate on the question of how we are going to meet the situation in 1920. Normally about 100,000 freight cars should be retired and replaced each year. The government made provision for only half that number, and prior to federal control the railroads themselves were unable to provide in advance for the growth of business.

In 1920 the railroads must settle with the government for addition and betterment expenditures during federal control. They must also provide for proper addition and betterment expenditures during 1920 itself and also for maturing obligations. This they cannot do under present worldwide conditions except with the help of the government, and suitable provision should be made by the government to meet this situation by advancing the necessary funds, which will be represented by obligations of the railroads and repaid within ten years with suitable interest. Instead of doing this, orders have already been issued which will restrict new work at least until March 1, which must affect the rest of the year seriously.

Unless the public takes a more active interest in the new legislation proper funding provisions may not be made to cover the entire program. This means a restriction of transportation facilities and equipment and consequently of business next fall.



Photo by Courtesy of C. M. Winter.

With the Russian Railway Service Corps A Set of Car Coupling Hooks of Different Types Used for Instruction Purposes



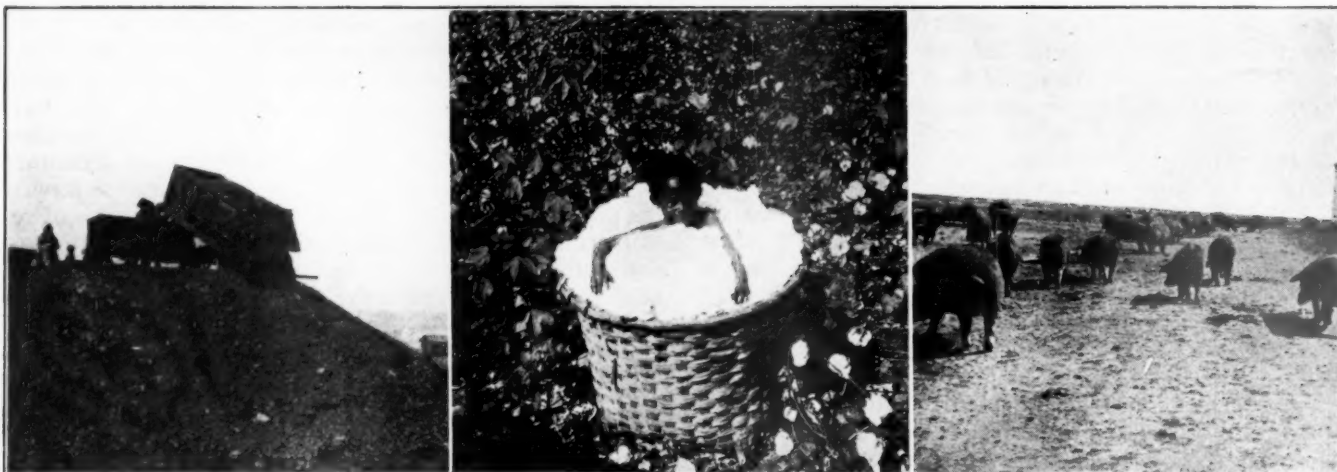


Photo by Kadel & Herbert

# The Need of Extensive Development of the Railways

How Much New Mileage Is Likely to Be Built in the Next Ten Years?—How Will It Be Financed?

By F. J. Lisman,

F. J. Lisman & Co., New York

**P**EOPLE IN MANY SECTIONS of the United States without adequate transportation facilities are anxiously awaiting the outcome of the railroad legislation, because they are naturally desirous of seeing their part of the country and their resources fully developed. Probably these people do not realize the fact that railroad construction hereafter will not be carried on on the same lines as heretofore. Formerly the promoters of new lines not only had the prospect of a fair rate of interest on their investment, but also the expectation of a substantial profit in the shape of additional earning capacity which could be capitalized through bonus stock, or paid out, over and above a fair return, to the parties furnishing the money. In the past at best it generally took longer to realize these expectations than was originally anticipated and in most cases during the waiting period the companies were unable to earn interest on the money invested. The original investors who had furnished the capital frequently became discouraged and sold out at a very heavy loss. At any rate, there was always the hope of profit, the proverbial gold pot at the end of the rainbow.

This period is done with, because under the present theory of capitalization of public utilities, these companies are at best entitled only to a fair return on the money if they should be successful, and have to take the chances of a loss at the same time. Of course, capital will not do this. People with money have many opportunities of investing it without risk, and if they take the risk they look for compensatory profit.

The construction of new railway lines might be subdivided into three different classes:

1. The construction of through lines or new links in existing systems which will form new through lines, either between different divisions of a system or in connection with other lines.

2. Lines to be built in connection with the development of mineral resources.

3. Purely agricultural lines which will bring lands capable of production nearer the world's markets.

Assuming that Congress passes legislation which will rehabilitate the credit of the railroad companies, the construction of railroads, which would mean new through lines or connecting links, will have to be done by existing railroad systems having established credits. New lines will be absolutely unable to obtain capital on the modern theory that the promoters are entitled only to a fair rate of interest.

During the last five years about the only new links of this kind which have been built are: The 40-mile extension

**F.** J. LISMAN, a New York banker, has had a broad experience in financing short line independent railroads in the United States. His personal detailed knowledge of the topography and resources of the country is remarkable.

With an international clientele before the war, F. J. Lisman & Company were in a position to advance \$3,000 or \$4,000 per mile on first mortgage bonds of proposed short lines, supervise the construction and distribute the bonds among their customers, taking the stock for their own services.

of the Gulf, Mobile & Northern to Jackson, Tenn., making this road a through line between the Gulf of Mexico and the central states; certain branches of the Chicago, Milwaukee & St. Paul System connecting the road with Great Falls, Mont., and Spokane Falls, Wash.; the new low-grade division of the Seaboard Air Line from Charleston, S. C., to Savannah, Ga.; and the recently completed joint line of the Southern Pacific-Spreckles interests between Yuma, Ariz., and San Diego, Cal., making a new through route to the only good harbor of southern California.

At the present time there are no other links of this kind in course of construction, but there are a number of sections of the country in the south and west where links of through lines will probably be constructed hereafter. For instance, there is the probability of another through route between Washington, D. C., and New Orleans, La., by building a connection between the Seaboard Air Line at Birmingham, Ala., and the Illinois Central at Jackson, Miss. There is always the possibility with the growth of the Pacific coast, of the Hill lines entering California by way of the Pitt river valley. Any large development of undiscovered resources in the eastern part of the state of Oregon might hereafter mean the construction of additional railroad mileage which would serve this territory, besides forming new through connections. There is the contemplated short route between Denver, Colo., and Salt Lake, which would mean an extension of the Denver & Salt Lake through the Uinta Basin to some point near Provo, Utah.

Many of the Rocky mountain states need railroad facilities, the development of which, however, will naturally depend on the opening up of mineral resources or on irrigation developments. It is a safe assumption, however, that none of these through lines will be built for a number of years.

#### Railroads to Tap Mineral Resources.

Minerals are generally hauled for long distances and as a rule must be carried at a very low rate to competitive markets. This means the construction of heavy lines with low grades. The largest amount of mineral tonnage is coal. The coal mines of the United States are now capable, if labor and cars were available at all times, of producing a coal tonnage from 20 to 30 per cent in excess of the country's requirements. The railroads would probably be better off if no new coal mines whatsoever were developed, because if a new mine is opened, say on a branch of the Pennsylvania or the Chesapeake & Ohio, it would probably mean that the railroad company would operate an additional spur, do additional switching service and haul no more coal than it does at present. In other words, the new mine would merely take away some of the business which existing lines are capable of handling. Each one of the coal carrying railroads has a certain undeveloped territory naturally tributary to its lines and is bound to protect its territory by building branches for fear that some competitor might otherwise do so.

All the large coal carrying railroads have repeatedly been up against the following very unsatisfactory proposition, which has been a great source of trouble and friction: Some man, say Mr. Jones, will buy some coal lands, located 20 miles away from the railroad, at a very low price. Mr. Jones will open up the mine and build the Jonesboro Railroad, a 20-mile road running from the mine to a junction point with the trunk line. He will have to pay the full local rate from the junction point to tidewater. The Jonesboro Railroad will charge the Jones Mining Company and any other shipper 20 cents additional for its services. At first Mr. Jones and his neighbors will be content with this situation, but before very long he, or more likely his neighbors, will commence to complain to the state or Interstate Commerce Commission about the injustice with which they are being treated. They will claim it is impossible for them to market their coal on account of this additional freight rate; that they are being throttled by discrimination on the part of the main line against them, etc. In many cases the railroad commissioners would listen to these complaints and the trunk line will then be compelled to give up 20 cents of its through rate to Mr. Jones's railroad for originating the business and a substantial present in the way of unearned increment would thereby be made to Mr. Jones and his fellow land owners.

Similar conditions were created in connection with the

building of branch lines to develop lumber districts. A conspicuous example of this is the construction of the Northwestern Pacific Railroad into the heavily timbered country of northwestern California. This Northwestern Pacific Railroad was constructed at a tremendously heavy cost through a very difficult country in order to develop the resources of that section, based on an understanding with the land owners that they would have to pay a higher rate for bringing their timber to market than owners of lands in fully developed sections of the state. Promptly after the Northwestern Pacific was completed the lumbermen made bitter complaints to the California Commission and to the Interstate Commerce Commission about the extortionately high rates which made it impossible for them to compete with other districts and promptly "got relief." This really meant that the investment made in the Northwestern Pacific by the Santa Fe and Southern Pacific was largely reduced in value and that a present of the unearned increment was made to these lumbermen practically at the expense of the railroad.

The question of building branches for the purpose of developing mineral resources will probably be left, the same as heretofore, to the competitive spirit of existing companies. If we should have government ownership, the question will probably be left to the district or section which has the biggest political pull. Of course if mines, or other tonnage, should be discovered in some section entirely without railroad facilities; say, for instance, a high quality of coal should be discovered in the Powder river district of southern Montana and northern Wyoming, then undoubtedly branch lines would be built by the Chicago, Milwaukee & St. Paul and Hill Lines in order to secure a share of this business.

#### Construction of Branch Lines in Agricultural Sections

Generally speaking, an agricultural section is slow to respond to the construction of new railroad facilities. Settlers do not rapidly change their method of cultivation and new colonies are also slow in developing. The construction of a new railroad line into a good agricultural country promptly doubles the value of the land, and in the course of 20 years such lands increase from four to eight-fold over previous prices. Heretofore constructors of railroad lines have not participated in the huge values which they have created by their efforts. This has been so largely for two reasons:

(a) Because lands were not marketable or available as collateral in financial centers.

(b) Because the people who furnish money for railroads did not fully realize the huge values they have created.

Hereafter the railroad contractor will have to look for his profit to the enhancement of lands and other resources rather than to the profits of the railroad, and no construction will be undertaken unless some such profits can be assured; that is to say, that we may revert to land grants without tying up large sums of money. Promising agricultural communities needing transportation facilities where owing to the scattered ownership, land grants are impossible will hereafter have to finance these roads themselves or do without railroads and will have to build first class automobile roads over which five-ton trucks may economically travel for distances of from 20 to 75 miles, carrying commodities for, say, five cents per ton mile. These rates will be somewhat higher than those prevailing on existing railroad branch lines, and the taxes in connection with the construction of motor roads will be a burden which should be spread, in accordance with the benefits derived, over all the land and property of the community which is to be developed, less such proportion as will be borne by the state and federal government.

During the period from 1896 to 1914 the average annual railroad construction in the United States fluctuated from 3,500 to 6,000 miles, being an average of 4,500 miles per annum. Probably 60 per cent of this mileage might be



classed as through lines with incidental local development, while the remainder was probably, to the extent of 15 per cent, mineral development, such as the Virginian Railway, the various coal branches of the Chesapeake & Ohio, Norfolk & Western, etc., and the balance for the purpose of local agricultural development.

The trunk lines will for many years be pressed to increase their yard and station facilities at important points, laying additional double track, reducing grades, acquiring equipment, etc. They are not likely to build agricultural branches unless operating expenses and interest on the new line is assured from the very beginning.

For purposes of comparison we may assume that the state of Iowa, as a fully developed state, needs no further railroad facilities, as there is probably no point in that state more than 15 miles distant from a railroad station. One of the least developed strictly agricultural states is Mississippi. The following comparison is therefore of interest:

	Iowa	Mississippi
Population .....	2,224,771	1,797,114
Area (sq. mi.) .....	56,147	46,750
Railroad mileage (1916) .....	9,946	4,438
Miles per 10,000 inhabitants .....	44.79	22.82
Miles per 100 sq. mi. ....	17.89	9.57

It would appear that the state of Mississippi, in order to be on an equality with Iowa, would approximately have to double its present mileage. Certain sections of Alabama, Tennessee and even Kentucky are served on about the same basis as the state of Mississippi.

The need of railroad mileage west of the one hundredth meridian depends on the development of agriculture, which in turn depends on irrigation. People who know the country state that probably not to exceed 5 per cent of the huge area between the one hundredth meridian and the western range of the Rocky mountains can be irrigated economically. Of course this 5 per cent in most cases would be capable of intensive cultivation as soon as colonists can be found who know how to work irrigated lands. This is a problem for the future to solve.

#### How Much Mileage Will be Built Annually?

The big question now arises, how much mileage is likely to be built annually hereafter and how will an undeveloped section get needed transportation facilities?

Unless Congress creates a broad basis of credit for the railroads, we will drift to government ownership. It is to be hoped that government ownership will not mean log rolling and the pork barrel on the order of the River and Harbor bills. Unless bills are passed which will fully restore railroad credit, new construction will remain at a minimum. Even if such bills do pass, it can be taken for absolutely certain that the principle will be established of nothing over and above a fair rate of interest. In view of this there will be no new railroad companies incorporated and we are not likely to see much additional mileage built hereafter except with some kind of government aid.

Probably new construction during the next five years will not exceed 2,000 miles in any year and quite likely it will be very much less than that. New through lines will only be built after several years. Lines for mineral development, such as branches to coal mines, will be built only under pressure through fear of competition; let us say, for example, the fear that the Baltimore & Ohio may develop certain sections naturally tributary to the Pennsylvania Railroad, or by parties who own coal lands and who are willing to bear the cost of building and operating a branch line in order to increase the value of their coal lands and to market their output. Automobile roads must take the place of most branch lines and the sparsely settled states will have to enact legislation to aid in railroad construction, which will be more or less along the lines of drainage and irrigation development.

#### How They May Be Financed

Transportation, whether by railway or highway, is an improvement which creates additional values for each district, the same as drainage and irrigation. Methods for working out the details of distributing the burden proportionate to the benefits of irrigation or drainage districts have reached a fair degree of satisfaction. No doubt much progress will be made from time to time.

In the case of a drainage district, lands benefiting thereby each pay a proportion of the cost of drainage. Under the laws of many states, owners of swamp or wet lands, by complying with certain statutory requirements, are authorized to form a local drainage district. The local courts after a proper election appoint a commissioner to assess the cost of the drainage in proportion to the value of the lands benefited thereby. Irrigation matters are handled in a similar way, under the well-known Cary and other acts.

There is no reason why a district which needs transportation should not be authorized to form a transportation district in a similar way. Let us say a district containing 200,000 acres wants railroad facilities; that is, a 20-mile railroad costing say \$500,000. The court could nominate a commission which would lay out this district and assess the lands for the cost of this railroad in proportion to the benefits received. Let us assume that the Walnut Creek district be authorized to issue \$500,000, Walnut Creek Transportation District 5 per cent 40-year bonds, the interest on which would be \$25,000 per annum, and the sinking fund, commencing in the seventh year would be \$15,000 additional per annum. This would mean that these 200,000 acres would have to produce \$40,000 annually from additional taxes. This assessment should be levied by the commission in accordance with the benefits received by the land, say \$1 for the best land adjacent to the proposed railroad, this amount gradually diminishing in accordance with the value of the land and the distance from the stations. Presumably arrangements could be made with some existing connecting railroad to operate the Walnut Creek line and to guarantee the district against any deficit in operating expenses with a further agreement to pay part, or all, the interest on the bonds and sinking fund in accordance with the amount of tonnage originating along the line. Such bonds would be a quasi municipal security, tax exempt and readily marketable. The bonds would be a first lien on the lands the same as irrigation and drainage bonds, and the moneys necessary to pay their interest and sinking fund would be collected by the tax collector. The cost of building the railroad would then fall exactly where it belongs, that is, on the people who are benefited thereby.

The drainage laws provide for extraordinary assessments on land owners in case of a break in a levee and for other similar contingencies, which might be likened to a washout or the deficit in operating a railroad.

The taxation of these transportation railroad aid districts might be handled in a different way. For instance, in a live stock region it would be perfectly fair to tax every head of cattle or sheep passing out of the district at a given amount. In a mineral region a tax might be imposed on every ton of coal or any other mineral resources passing over the line.

Construction may be let by public tenders and the bonds must also be sold by public tenders after due advertising as prescribed by law.

If the prospective benefit to the land owners is not sufficient to induce the building of the railroad, then the road has no reason for existence and should not be built.

Of course no laws can thoroughly provide against incompetence of the authorities or against loose supervision of contractors. Probably the construction of these district aided railroads will cost more than those built by or under the eyes of owners. And the truth of the old adage "Public



waste is greater than private profit" is likely to again be proven.

In many cases completed districts it would be possible even before construction of the proposed line is begun, to obtain a contract with a connecting railroad not only to pay the operating expenses, but a part or possibly even the whole of the interest and sinking fund charges.

The leasing railway company would thus get cheap money through the sale of "tax exempt" securities, and would in any event avoid payment of taxes, which it should not be called upon to pay anyway before it is fully self-supporting. A railway has always created large taxable values even if it failed to earn its own operating expenses. There are many cases on record where the taxes paid by new railway lines to communities which it has served to create not only took all of its net earnings but sometimes upwards of 20 per cent of its gross earnings.

The quasi municipal transportation district will be the outcome of the new principle that capital is entitled only to fair interest on the money and to no profit. Under such conditions the men who reap the benefit must take the risk.

## The Daylight Saving Agitation.

ALL NEW ENGLAND is being agitated to favor the renewal of "daylight saving" next March, in spite of the adverse action of Congress; and unless a sober second thought is aroused to call a halt, there will probably be radical action by one or more legislatures. The three northern states, largely agricultural, are not enthusiastic and may not act; for there, as everywhere, the farmers are opposed to a change; but the Boston Chamber of Commerce is taking the lead and the urban interests are likely to have strong influence with the legislatures of Massachusetts, Connecticut, and Rhode Island. The people of New England sometimes repine at the way in which the rest of the country, the boundless west, looks upon their section as a remote corner; but in this matter they seem to be taking voluntary action to separate themselves, actually; for to set their clocks ahead when other states do not, is to introduce a confusion that would be absolutely indescribable. It may not kill anybody; neither will it draw any visible geographic line, or cause losses which can be measured in millions of money or tons of coal; but the confusion at railroad stations and at other places, would be felt by everybody, everywhere. The city authorities of New York City and of Philadelphia have already voted in favor of changing clocks in the Spring; and New England is perhaps counting on the magnitude of numbers as an argument; the six states and those two big cities contain some fifteen millions of people; but the people have not voted, the city fathers have not done much consulting, and the scheme remains provincial.

Judging by what little argument has appeared in print the proponents of "summer time" have not given very serious thought to the actual difficulties of the situation; they expect that their scheme will be able, simply by its boldness and its rapidity of movement, to compel the unwilling to follow. That argument was used to some extent in the Congressional agitation, when the war-time act was passed; but the situation at the present time is different. Farmers then were acquiescent, but they want their rights and they feel free, now, to fight for them. The war-time act also won over some of the objectors by citing the successful example of Great Britain; but Britain never tried to change clocks by districts; it was the whole country or none.

It goes without saying that our railroads will accommodate their passenger trains to the wishes of the people; they did it prior to November, 1883, when every state had its own standard of time and traveling salesmen had to have two (or more) minute-hands on their watches in order to facili-

tate reading the timetables of different roads. But the trouble with the present situation is that the problem is so confusing that by the time the different experiments had been completed the summer would be half over—probably wholly over.

The Congressional act prescribing standard time *still stands*, except as to the summer change. That is to say, the railroads, being interstate carriers, and subject to federal law, cannot lawfully set their clocks forward, either on March 28 or at any other time. The section of the law providing for this change was repealed. The rest of the act, including the clauses regulating the sittings of courts and other activities controlled by federal law, is still in effect. If the Pennsylvania Railroad wishes to accommodate Jerseyites who desire to go into New York City an hour earlier on Monday morning, March 29, it will have to get out a new timetable. It will have to run its 8 o'clock train at 7, the 7:30 at 6:30 and so on; and the passenger will have to have one watch for his house and office activities and another by which to catch trains. Philadelphia may want the same changes as New York; but Trenton, half way between, may, or may not; and Baltimore, more considerate to the farmers, may propose something else. If Massachusetts (or Boston alone) should change clocks, and Maine should not, the trains between Portland and Boston would accommodate some of the people and discommode others. The theorist or the thoughtless would settle this point by calling for additional trains, one set to accommodate Portland and another set to accommodate Boston; but that would involve an additional cost which the public would have to pay for. This payment might be camouflaged; but the actual scarcity of coaches, of locomotives, and of coal which might ensue, could not be concealed. Every passenger would suffer from it.

In short, the well-meaning people who wish to aid city people to get up an hour earlier in the morning without knowing it, ought to direct their efforts toward Congress. If it is permanently better to live all summer by dishonest clocks than to get out of bed in the morning when we ought to (*and want to*) simply by the act of the will (aided by a two-dollar alarm clock) there must be some way of composing the differences between city and country. The farmers and their cows need not be overborne; neither need the city man abandon his selfishness or his laziness. Congress can find a way, if it sets out to settle the problem rationally. But any action by state legislatures is little better than a vote to go back to the clumsy arrangements of 1883. Such laws would make William F. Allen (the father of standard time) turn in his grave. Railroad officers should arouse their Congressmen on this question without delay. The railroads could change a thousand timetables at a cost of a few hundred thousand dollars and could submit to all sorts of disturbances; but the people would be disturbing themselves more than they would the railroads; and it is for every railroad officer to show his neighbors, without delay, what the present agitation is leading to.

Sixty railroad scholarships will hereafter be offered each year by the Southern Pacific Company, in its agency school at San Francisco, for young men between the ages of 18 and 23. Appointments will be made by division superintendents and heads of departments, who will also be charged with the responsibility of finding places for the appointees upon graduation. The scholarships are designed to prepare young men for positions in the freight and passenger departments and the general offices of the company. The awards will also include the payment of a nominal sum while the appointee is being instructed. E. L. King, superintendent of telegraph, San Francisco, Cal., has been placed in general charge of the plan.



Photo by Kadel & Herbert

## Railways Far Behind in Construction of New Lines

Comparisons with Previous Years and Survey of Undeveloped Areas Indicate Shortage of 6,000 Miles

OVER 6,000 miles of new railway lines should be built during the next three years if the roads are to meet the demands of the country for extensive development at the end of that period. This will require the expenditure of more than \$500,000,000, and is entirely aside from even larger expenditures which will be required to equip the existing lines to the point where they will be able to handle the traffic confronting them expeditiously and with economy. Furthermore, these figures do not contemplate any rapid expansion, such as characterized the period from 1900 to 1907, when over 40,000 miles of lines were built, an increase of over 5,000 miles per year.

In the ten-year period from June 30, 1905, to June 30, 1915, the reports of the Interstate Commerce Commission show an increase in the miles of line owned by the roads of the United States of 35,688, while the records of new lines built for the years 1906 to 1915, inclusive, compiled by the *Railway Age*, show that 33,518 miles of lines were constructed. These figures show an average mileage of new lines built each year of approximately 3,500. Contrast this with the record since 1915. In the four years just ended only about 3,500 miles have been constructed, equivalent to one year's average in the period immediately preceding and an annual average of less than 900 miles. The fact that this decline began in 1914 and that the mileage built in that year was 1,500 miles less than in 1913 and that the decline has been constant since that time emphasizes the result of disturbed conditions during and since the war, but, while the sharpness of the drop was due to these causes, the underlying conditions undoubtedly would have caused a

falling off in railroad building without the war. These underlying conditions have not yet changed materially, although the legislation now immediately in prospect has many possibilities. Furthermore, the country has had a recent lesson in the effects of a restrictive policy towards the railroads which should be considered when we are facing an era of widespread development.

It is probable that conditions will not change in the near future so as to require as large a program as was followed in the decade closing in 1915. The need for long extensions in the future, apparently, will be comparatively very much less than in the past. Still there are many large areas in the country now untouched by railroads and there is need for shorter branches to tap these undeveloped territories. Owing to the fact that construction of this character ceased almost entirely during the war period the roads are behind a normal schedule of extension building, and if the mileage of railroads is to be restored to a normal relationship with the commercial and industrial needs of the country by the year 1923, it seems conservative to believe that the accomplishing of this end will require the construction of at least 6,000 miles of additional lines during the next three years.

F. J. Lisman's article, which appears on the preceding pages of this issue, discusses the practical possibilities of building railroads to develop new territory under present conditions. The *Railway Age* has long given careful study to this question and has supplemented its information, through correspondence with men more or less closely in touch with local affairs in the various states, whereby it has collected

**NEW THROUGH LINES,** lines to develop agricultural resources, and lines to tap mineral deposits, are all possibilities of the future, but can no longer be undertaken as speculative enterprises.

The country which is benefited must, therefore, pay an assessment which will assure a fair return on the new capital invested. Such an assessment would be analogous to drainage district taxes.

New construction will be about two thousand miles a year.



a large amount of data as to the needs for new railroad building. It should be borne in mind that nowhere in this article or in Mr. Lisman's article is the subject of the intensive development of existing railroads discussed. Neither have we considered extensions designed to reach sources of traffic now served by other roads. In all that follows the assumption is made that where new railroad mileage is suggested, it is with the idea of developing a territory rather than of meeting a need for transportation facilities that has already been more or less fully met.

Furthermore, it cannot be assumed that because a line is mentioned as one which would develop territory not now provided with railroad facilities, such a line would be profitable. It was a curious and interesting fact that in the correspondence with state commissioners few hazarded the opinion that a railroad built to develop new territory would be of itself profitable, although some correspondents sug-



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#### The New England District

gested that an indirect profit would accrue to existing lines through traffic brought to them by extensions. Mr. Lisman covers the economies of this situation quite fully, and it is mentioned here only to guard against misinterpretation of the specific mention of territory not served by an existing railroad.

For the purposes of this discussion the United States has been divided into six sections, following the lines of the operating divisions made by the United States Railroad Administration in establishing the regions, although the combinations in this article are a little different. Section One corresponds to the New England district of the Eastern region. Section Two includes the rest of the Eastern region (the Central and the Ohio-Indiana districts) and the Allegheny region. Section Three comprises the Pocahontas and the Southern regions, while Section Four corresponds to the Southwestern region. Section Five includes the Central Western region, and Section Six the Northwestern region.

#### The New England District Needs Few Lines

Generally speaking, the so-called New England district, which includes Maine, New Hampshire, Vermont, Massachusetts, Rhode Island and Connecticut, offers few opportunities for new through lines or for links in existing systems which will form new through lines. It is true that in New Hampshire, where the north and south roads are apparently ample for present needs, the public would be better served if more railroads were provided crossing the state east and west. This is, however, a matter of convenience rather than of necessity and the building of any considerable mileage of new lines in the state for years to come is unlikely.

In Vermont the situation is somewhat similar, although a line extending from Montpelier, in Washington county, north to a connection with the St. Johnsbury & Lake Champlain, and then still north along the course of Black river through Craftsburg, Albany and Coventry to Newport on the Canadian Pacific, a distance of approximately 50 miles, has been considered. Another line which has received attention in this state would provide a short line between the cities of Montpelier and Rutland by building directly over the mountains in a southwesterly direction from Montpelier, connecting with the Rutland and the Delaware & Hudson at Rutland.

A number of townships in the western and central part of Massachusetts are without transportation facilities, but they are, for the most part, sparsely settled and in themselves hardly warrant the construction of new lines. They are, however, in a direct line between Albany, N. Y., and Boston. The Boston & Albany enters Massachusetts from the west very nearly on the boundary between West Stockbridge and Richmond. It then bears to the north to Pittsfield before swinging south and east to Springfield. This line carries a very heavy traffic with enough tonnage perhaps to warrant the construction of a short line between the New York state line and Westfield. Such a line would supply the needed local service to a part of this undeveloped district. Probably neither Connecticut or Rhode Island is in need of additional lines.

The situation in Maine is somewhat different than that in the other states comprising this district. The Canadian Pacific traverses this state from east to west, its line practically dividing the state into two equal parts. The territory south of this road is reasonably well provided with railroad facilities. North of this line the situation is reversed, the only railroad serving this section being the Bangor & Aroostook, which traverses the northeastern portion of the state only, leaving a territory north of the Canadian Pacific and west of the Bangor & Aroostook, measuring approximately 80 miles east and west and 120 miles north and south, entirely without railway facilities. A considerable portion of this area is heavily wooded. When cleared the land is fertile and as it is taken over for agricultural purposes the necessity for railway facilities will become urgent.

#### Central and Ohio-Indiana Districts

##### and the Allegheny Region

Of the states represented in this section New York, New Jersey, Maryland, Delaware and Pennsylvania were among the earlier states in the country to be developed by the railroads and offer few possibilities for extension, new lines or branches of any length. An examination of past construction records bears out this statement and discloses the fact that new construction in the first four mentioned states has been in negligible quantities for years past. In Pennsylvania the development of coal lands has been and will be an important factor in branch line construction and to this extent has constituted an exception. Only in exceptional years, over a 15-year period, has the new mileage to coal mines in this state totaled less than 60 miles, ranging from that



to more than 100 miles. While there are too many factors to be considered in the building of such lines to make a forecast safe it seems reasonable to expect that for some years to come new construction of this character will keep pace with past records.

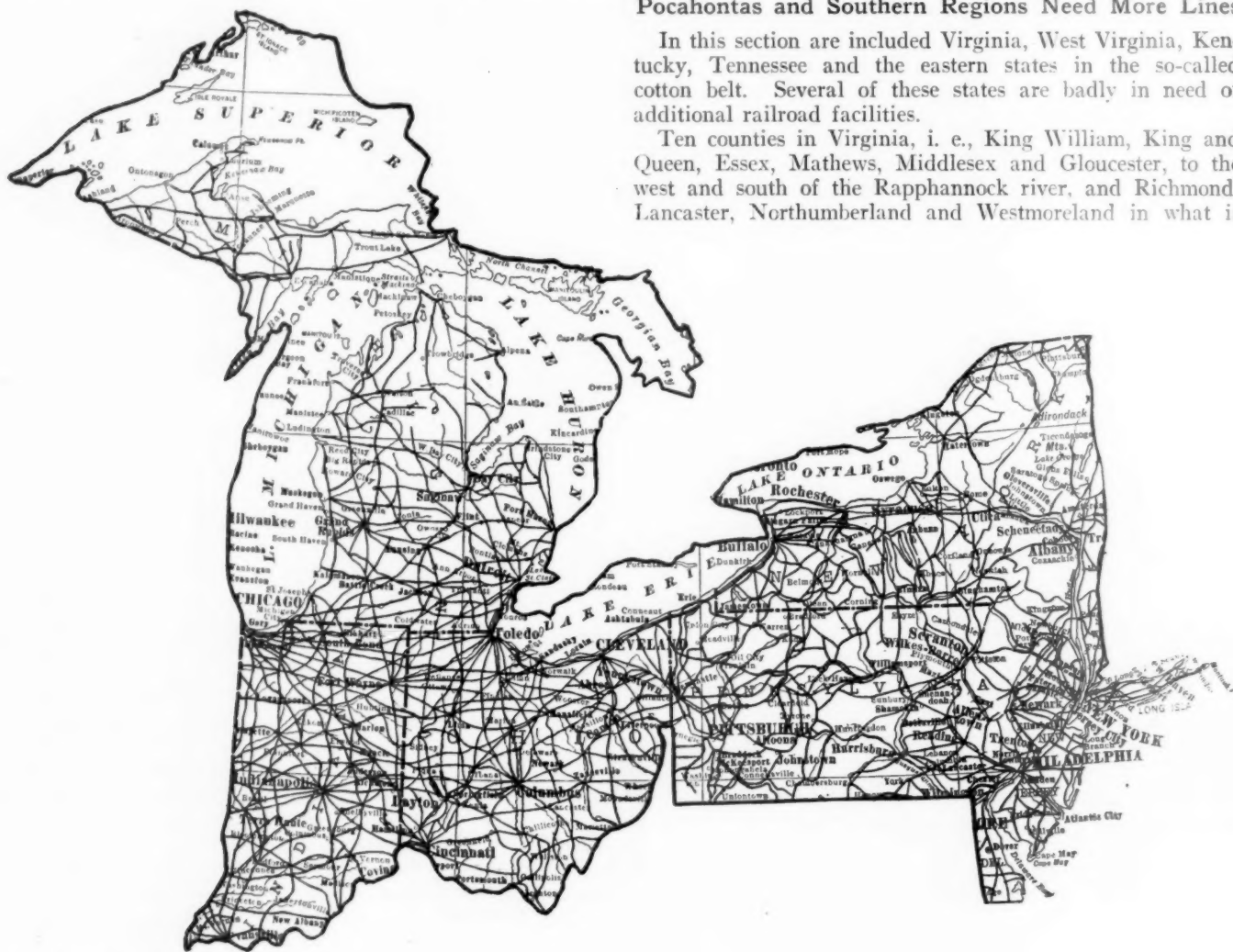
The geographical location of Ohio and Indiana in reference to the building of the trunk lines between New York and Chicago and St. Louis and between the middle states and the Great Lakes has been the important factor in their development in a railroad sense. The most important recent

between southwest United States and Canada, and Port Huron is of only slightly lesser importance. Because of the advantages offered by water transportation the railroad system was well developed at a comparatively early date. No important construction of new lines has been attempted in recent years and the territory is reasonably well developed as far as local facilities are concerned. As a matter of fact, a large part of the mileage in the northern part of the Southern peninsula—the cut-over timber area—would not be justified on the present traffic.

#### Pocahontas and Southern Regions Need More Lines

In this section are included Virginia, West Virginia, Kentucky, Tennessee and the eastern states in the so-called cotton belt. Several of these states are badly in need of additional railroad facilities.

Ten counties in Virginia, i. e., King William, King and Queen, Essex, Mathews, Middlesex and Gloucester, to the west and south of the Rappahannock river, and Richmond, Lancaster, Northumberland and Westmoreland in what is



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#### Central and Ohio-Indiana Districts and the Allegheny Region

construction in either of these states was the building of the Indianapolis-Frankfort Railroad in Indiana which provides the Pennsylvania Lines with a direct route over its own rails from Indianapolis to Chicago.

East of Elkhart, Ind., the counties of Elkhart, Lagrange and Steuben adjoining the Michigan border, while well served with north and south lines, present an apparently legitimate need for an east and west line. This is a very productive section and a line which would connect with the New York Central at Elkhart on the west and with the Wabash, New York Central and some other railroad on the east, would afford a much-needed local service and an additional through route between Toledo and Chicago.

The railroad development in the southern peninsula of Michigan has been directly affected by its geographical location and the development of Canadian lines and the Great Lakes transportation system. Detroit is the natural gateway

called the northern neck of the state, between the Rappahannock river and Chesapeake Bay, are without a mile of railroad. These counties had a combined population of more than 96,000 in 1910, and, taken together, they contain an area in excess of 2,100 sq. miles. The ten counties are agricultural in character and the physical characteristics of the territory are such that construction would be a simple matter. The Richmond, Fredericksburg & Potomac and the Chesapeake & Ohio, both of which skirt the territory in question, would furnish outlets for any new lines built.

Another county, Buchanan, with a total area of 514 sq. miles and having a population of more than 12,000, is served only by the Big Sandy & Cumberland Railroad, a narrow gage line which traverses the central portion of the county northward to a connection with the Norfolk & Western in West Virginia. This county is said to be practically a solid mass of profitable mineral and the provision of adequate facilities

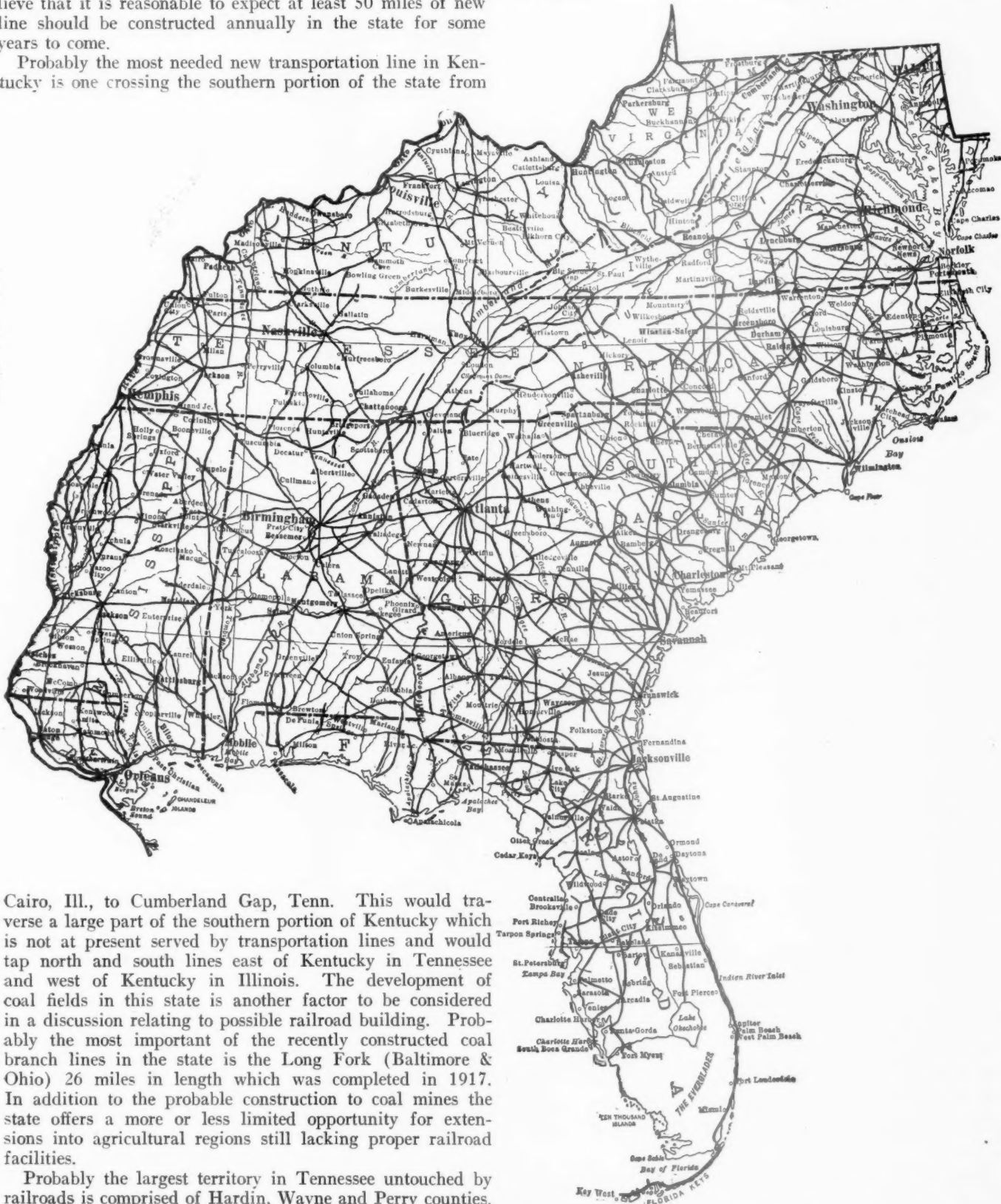
to develop the resources of this territory is a possibility of the near future. Very likely any new construction into this territory will find its outlet to the north, approximately on the route of the Big Sandy & Cumberland.

West Virginia, in the development of its mining territory requires constant additions to its railway mileage. An inspection of past construction records would lead one to believe that it is reasonable to expect at least 50 miles of new line should be constructed annually in the state for some years to come.

Probably the most needed new transportation line in Kentucky is one crossing the southern portion of the state from

From points in Hardin county the distance to the nearest available railroad is approximately 40 miles. Tennessee, in proportion to its area, is one of the least developed states in the south in-so-far as railroad facilities are concerned.

The areas in North Carolina bounded roughly by the cities of Wilson, Rocky Mount, Henderson, Weldon, Raleigh, Goldsboro, Newbern and Wilmington, are in need of addi-



Cairo, Ill., to Cumberland Gap, Tenn. This would traverse a large part of the southern portion of Kentucky which is not at present served by transportation lines and would tap north and south lines east of Kentucky in Tennessee and west of Kentucky in Illinois. The development of coal fields in this state is another factor to be considered in a discussion relating to possible railroad building. Probably the most important of the recently constructed coal branch lines in the state is the Long Fork (Baltimore & Ohio) 26 miles in length which was completed in 1917. In addition to the probable construction to coal mines the state offers a more or less limited opportunity for extensions into agricultural regions still lacking proper railroad facilities.

Probably the largest territory in Tennessee untouched by railroads is comprised of Hardin, Wayne and Perry counties. Taken together the counties have a population exceeding 39,000 and contain an area of more than 1,200 sq. miles.

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The Pocahontas and Southern Regions

tional railway facilities, as is Caswell county on the Virginian border. Within the first mentioned territory are numerous points 20 miles or more from a railway. In the second area an extension of the Dover & South Bound to a connection with the Atlantic Coast Line would supply the badly needed local service and reduce the distance from Wilmington to points north. Caswell county, which has a population of 15,000, and an area of 402 sq. miles is entirely without railroad facilities except in the extreme northern portion.

In South Carolina a railroad extending along the south side of Saluda river to Saluda and then northwest to Greenwood is a possibility. Also certain portions of Anderson and Oconee counties in the northwestern part of the state would be greatly benefitted by an extension of the Blue Ridge Railway from Walhalla north. This would shorten the distance from the western part of the state to points north. This line involves a tunnel through the Chattanooga ridge which now lacks only a few hundred feet of being completed.

The coast counties of this state are particularly adapted

road of South Carolina. This would imply building a line approximately 35 miles long.

The most probable new line construction in Georgia is that projected up the Chattahoochee river valley northeast from Atlanta through Milton, Forsyth, Dawson, Lumpkin, Union and Towns counties and into Clay and possibly Macon counties in North Carolina. This line would exceed 100 miles in length and open up a fine section of the state, capable of very large development. Another line talked of would run northeast of Atlanta to Anderson, S. C., a dis-



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The Southwestern Region

to truck farming. The portion of Charleston county lying east of the Wando river is almost exclusively devoted to this industry and is entirely without railroad facilities. A short line from Mt. Pleasant, near Charleston to McClellanville, connecting with the Seaboard Air Line, would be of great value in developing the industry and should bring good results to investors, if adequate rates were allowed to be charged.

Another line in this state which would open up a rich territory would extend from Branchville, in Orangeburg county, to Vance, on the Atlantic Coast Line, and to St. Paul in Clarendon county, connecting with the Northwestern Rail-

tance of approximately 110 miles. Such a road would traverse a rich agricultural section of the state and would not involve expensive construction. Another line which would be desirable and probably self-sustaining and which has been under consideration for years would extend southwest from Atlanta through the counties of Campbell, Carroll or Douglas, Heard or Coweta and through Randolph county in Alabama.

There is not a county in Alabama not touched by a railroad. The counties of Lawrence, Marion and Winston are adjacent to one another and constitute the territory in the state with the poorest developed railroad facilities. The



character of the territory embraced, however, is such that the building of additional roads is unlikely. Clay, Randolph and Cleburne counties make up a second undeveloped area with the same handicap to additional construction.

Florida contains an area of 54,861 sq. miles and has 5,062 miles of railroads, or less than any other state in this section in proportion to its area. The future additions to its railroad system will to a great extent be built in connection with the agricultural development of the state.

### Southwestern Region Fairly Well Supplied

There is included in the southwestern section the states of Louisiana, Arkansas, and parts of Missouri, Oklahoma and Texas. This section is fairly well served by through lines and most of the railroad building which will be done will be to develop new agricultural areas or tap new mineral resources.

Louisiana, with a population of about 1,800,000, has 5,603 miles of railroad or 12.34 miles per hundred square miles of territory, and 30.76 miles of railroad per 10,000 inhabitants. The state is a network of railroads with no squares of 50 miles or more without railroad facilities. It may, therefore, be classed as one of the states in which only a limited amount of new mileage is likely to be built in the immediate future.

Arkansas has a population of about 1,750,000 and has 5,294 miles of railroad, or 10.08 miles of railroad per hundred square miles and 30.55 miles of railroad per 10,000 inhabitants. There is one section extending north from Little Rock through the center of the state to the Missouri state line, with comparatively few railroads. From Little Rock, the Missouri Pacific runs northeast to the northeastern corner of the state, while this road also has a line from Little Rock following the Arkansas river northwest to Fort Smith. There is no railroad crossing the counties of Faulkner and Van Buren, a distance of about 100 miles. The Missouri & North Arkansas runs diagonally northwest across Cleburne county, touching the northern corner of Van Buren, and through Boone and Carroll county. This leaves a quadrilateral of approximately 50 miles from southwest to northeast, and 150 miles from southeast to northwest without railroad facilities. It is probable that this agricultural country could be further developed by the building of 100 to 150 additional miles of railroad.

Southern Missouri is fairly well supplied with railroads. The St. Louis-San Francisco running southwest from St. Louis through Springfield might at some future time find a northwest-southeast line running through Lebanon in Laclede county and serving Hickory, Dallas, Wright and Texas counties, an agricultural feeder that would develop new territory north of the Ozarks.

Oklahoma has a population of 2,246,000 with 6,454 miles of railroad or 9.30 miles of railroad per hundred square miles, and 29.64 miles of railroad per 10,000 inhabitants. Oil discoveries have brought great prosperity to towns such as Tulsa. Branch lines to serve newly developed oil districts are a possibility of the near future and some sections of the state still need railroad facilities. Osage county has the Midland Valley running diagonally through it from northwest to southeast, but it is possible that a line which has already been projected from Caney, Kansas, on the Atchison, Topeka & Santa Fe will be built southwesterly through Pawhuska on the Midland Valley to Fairfax on the Santa Fe. As an example of the development of the mineral resources, a line could be built from Ringling, the present western terminus of the Oklahoma, New Mexico & Pacific, north to a point on the Chicago, Rock Island & Pacific, or even possibly to Oklahoma City, and extended south of Ringling to the Texas oil fields south of the Red river. The northwestern corner of Oklahoma has comparatively little railroad mileage, and the territory between the

Canadian and the Cimarron rivers would be developed by a line running northwest of Oklahoma City, extending possibly into the coal fields of New Mexico.

Texas has 15,866 miles of railroad or but 6.05 miles per hundred square miles of territory. The population is about 4,500,000, so that there is approximately 36 miles of railroad per 10,000 inhabitants. The development of the Texas oil fields will probably call for branch line building while in the strip of territory running southwest from Austin and Brownwood to the Rio Grande, varying in width from 100 to 200 miles, there is a lack of railroad facilities. A line from Shreveport on the St. Louis Southwestern to Beaumont, Texas, would run through virgin timber country and through territory which is supposed to contain oil.

### Central Western Section Has Undeveloped Areas

This section includes the states of Illinois, parts of Iowa and Missouri, Nebraska, Kansas, New Mexico, Colorado, Wyoming, Oregon, Utah, Arizona, California and Nevada. It is a territory through which two ambitious projects were started for additional through lines, one the Denver & Salt Lake project, and partially built by the late David Moffatt of Denver, Col., and the other the Pacific Coast extension of the Denver & Rio Grande, the Western Pacific. Neither project has been financially successful.

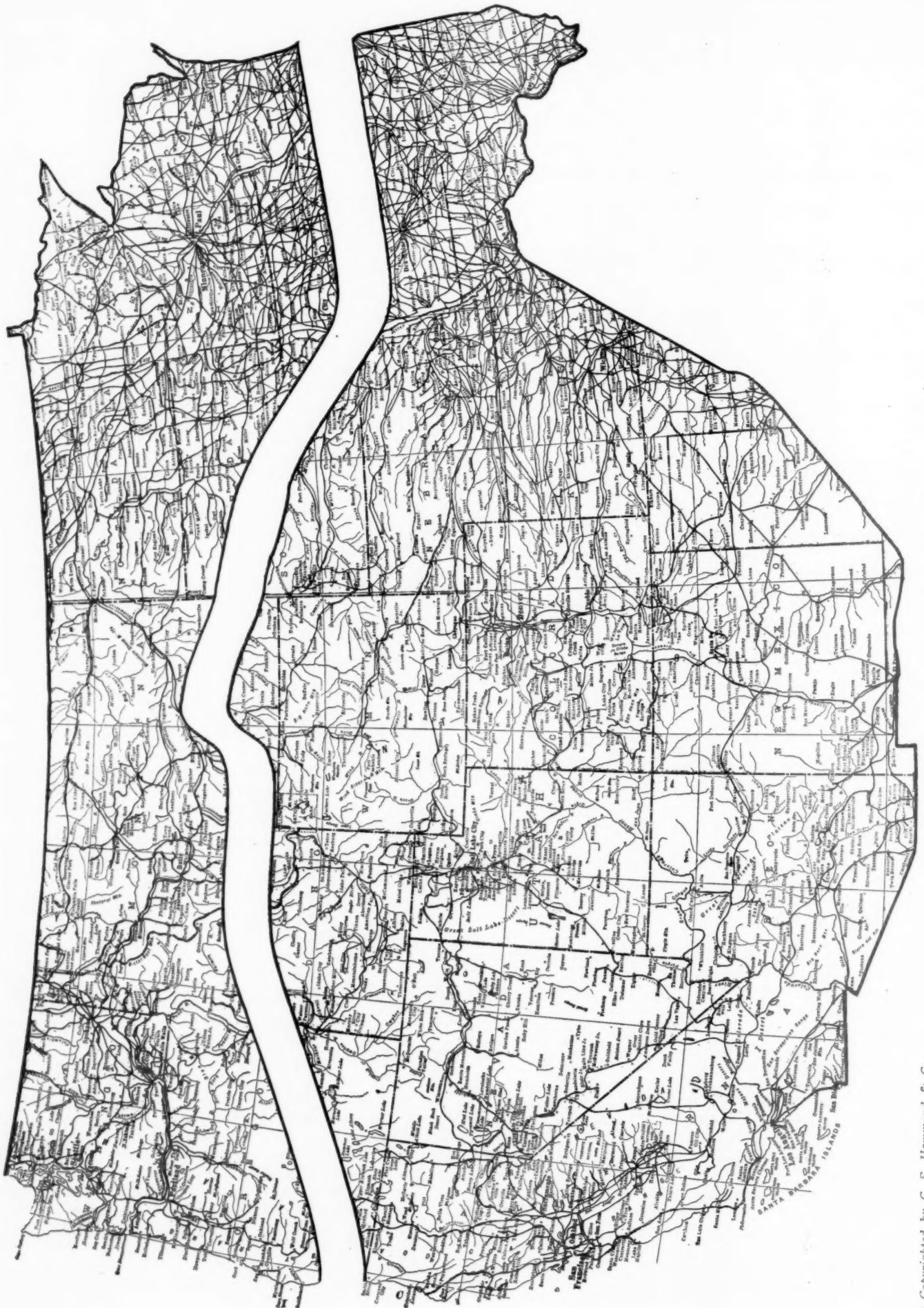
Illinois has a population of something over 6,000,000, and of these about 2,500,000 are in Chicago. The state has 12,141 miles of railroad or 21.67 miles to each hundred miles of territory, and 19.81 miles to each 10,000 inhabitants. The state is a network of railroads. The fact that it has on the west, the St. Louis and Rock Island gateways, with Cairo in the south, has led to a railroad development which appears to need little if any extension of length in the immediate future.

Iowa has 9,946 miles of railroad or 17.89 miles per hundred square miles and 44.79 miles of railroad per 10,000 inhabitants. The state has been the hotbed of railroad baiting, and is now oversupplied rather than undersupplied with railroads. There are few places in the state that are more than seven miles from a railroad station, and within the past few years about 100 miles of line have been abandoned and junked.

The northern part of Missouri is well covered by both east and west and north and south lines. Good roads rather than new railroads apparently are what this part of the country is most in need of.

Nebraska has a population of about 1,300,000, and has 6,169 miles of railroad or 8.03 miles per hundred square miles and 48.65 miles of railroad per 10,000 inhabitants. The map would indicate that there are large tracts of territory without railroad facilities, but since much of this territory is grazing land, it may be some time before railroad extensions into it would pay. The Chicago, Burlington & Quincy has a number of branch lines extending northwesterly from its main line into the counties of Boone, Wheeler, Garfield and Custer. Two of these lines terminate at Burwell in Garfield county, and Ericson in Wheeler county. The Chicago & North Western runs east and west about 60 or 70 miles north of these two towns. The territory north and west of Ericson and Burwell to the Chicago & North Western line has developed rapidly, and it is quite possible that a line from either Ericson or Burwell extending north or northwest to a connection with the Chicago & North Western would open up new agricultural territory which is now largely given up to grazing.

There is a strip of territory between the Burlington on the north and the Union Pacific on the south which in time will probably be developed through railroad branch line extensions by one or the other of the two east and west roads. The character of this development may be judged from what has taken place in the past. The Union Pacific threw out



Map Copyrighted by C. S. Hammond & Co.

The Central Western and the Northwestern Districts



a branch line northwest from Kearney to Callaway on this main line a few years ago. This was later extended to Grande Station and then to Stapleton. This line may possibly be extended gradually until it bisects the 60-mile wide strip of territory lying between the Union Pacific and the Burlington.

Kansas, lying just to the west, is rather better supplied with railroads than Nebraska. With a population of 1,800,000, the state has 9,344 miles of railroad, which is 11.43 miles per hundred square miles of territory and 51.25 miles of railroad per 10,000 inhabitants. There are no 50-mile squares without railroad facilities, and since the territory is agricultural, good roads and possibly some short branch line extensions of steam roads in the western part of the state will be the lines of future development, at least for some years.

New Mexico has a population of less than 500,000. It has a railroad mileage of 3,039 miles or 12.48 miles of railroad per hundred square miles of territory, but has 74.69 miles of railroad per 10,000 inhabitants. San Juan county, which is in the northwest corner of the state, contains large coal fields, and yet the only piece of railroad in the whole county is a branch of the Denver & Rio Grande running down to Farmington on the San Juan river. A railroad could be built north from Gallup up the Choiski Valley through coal fields to a connection with the Denver & Rio Grande at Farmington, about 100 miles of line.

The entire western border of the state is without railroad facilities except for the east and west line of the Atchison, Topeka & Santa Fe running through Gallup and the Southern Pacific and Atchison, Topeka & Santa Fe running through Deming, over 200 miles south. The country is mountainous, but probably contains very considerable mineral deposits, which of course can only be opened up through the building of railroad facilities.

In the central part of the state there is a north and a south line of the Atchison, Topeka & Santa Fe following the Rio Grande, and the New Mexico Central, running south to Torrance where it meets the El Paso & Southwestern. Southeast from Torrance there is a stretch of about 70 miles of country without railroad facilities and a connection could be built from Torrance on the El Paso & Southwestern to Rosewell, which is the second largest city in New Mexico. To go from Rosewell to Santa Fe, the capital of the state, one has to go northeast to Clovis, or take a stage or automobile across country to Carrizozo.

There is a fairly rich agricultural and grazing territory lying between Taos and Ute Park, which latter is the end of a branch of the Atchison, Topeka & Santa Fe. The territory around Taos appears to be worth developing. The line previously mentioned running southeast from Torrance, might possibly form the connecting link for a through road from Puget Sound to the Gulf of Mexico. There is now a grade built from Deming south to Columbus, and a possible route for a new railroad opening up a large amount of territory would be from Gallup south to Deming, and from there using the old grade to Columbus, and possibly extending south into Mexico.

Colorado has a population of a little less than a million, and has 5,701 miles of railroad or but 5.50 miles of railroad per hundred square miles of territory and 59.73 miles per 10,000 inhabitants. The eastern portion of the state is without north and south railroads, and the Chicago, Burlington & Quincy, the Chicago, Rock Island & Pacific, the Union Pacific, and the Atchison, Topeka & Santa Fe which cross the state from east to west have built almost no branch lines or feeders west of Denver and Pueblo. The country is grazing land, although fertile when put under cultivation. The entire southeastern corner of the state, a territory 60 by 100 miles, including the entire county of Baca, is now without railroad facilities. Presumably, if this terri-

tory is to be developed, the Santa Fe would drop down a branch line from Lama or Las Animas. In the southwestern corner of the state there is mineral territory, mountainous and expensive to build into, but with large deposits of low grade ore. This territory is now served only by a narrow gage line of the Denver & Rio Grande. The Denver & Salt Lake (the Moffatt road) never got further west than Craig, and the territory between Craig and the Colorado-Utah state line—100 miles—is without railroad facilities.

Wyoming has a population of only 180,000 and has but 1,906 miles of railroad, or only 1.95 miles per hundred square miles of territory, but has 107.31 miles of railroad per 10,000 inhabitants. Cooke county is in the northeastern corner of the state in which the only railroad mileage is a branch which extends a few miles to Aladdin from South Dakota and the Chicago, Burlington & Quincy, which crosses just the southwestern corner of the county. There are supposed to be very considerable mineral deposits, including coal, gold and silver, the latter probably contained in low grade ore. There is considerable timber and the entire county is fairly well covered with large ranches raising cattle and sheep. Settlers live as far as 125 miles from the nearest railroad.

Big Horn county, which lies just west of the Big Horn mountains on the northern boundary of the state, is crossed by a line of the Chicago, Burlington & Quincy running north and south through it. The country of the Otto river and Greybull is understood to be very fertile and the government has under consideration the building of reservoirs and canals in connection with what is known as the Oregon Basin project, which would furnish water for land now impossible of cultivation. An east and west road, therefore, might be built from Greybull on the Burlington, west, possibly as far as Cody. There are supposed to be considerable coal and natural gas deposits in this territory.

In the center of Wyoming, Fremont county, more than 100 miles square, has only a branch line of the Chicago & North Western, extending into it as far as Lander, while the Burlington crosses the northeastern corner. The Shoshone Indian reservation, which is in the middle of Fremont county, is now being settled, and presumably an east and west line extending as far across the reservation as the foot hills of the Wind River range would open up a sugar beet and alfalfa country of good possibilities. Lincoln county which runs north and south along the western boundary of the state more than 160 miles, and is 50 miles across from east to west, has only one line, the Oregon Short Line, running across the southern end. The county is mountainous, but is supposed to be rich in low grade ores and coal. It has a water supply for extensive hydro-electric developments, but is now largely a live stock county.

Oregon has a population of less than 900,000 inhabitants. It has 3,067 miles of railroad or but 3.21 miles per hundred square miles of territory and 37.03 miles per 10,000 inhabitants. Practically the entire central portion of the state, a rectangle more than 200 miles square, is almost entirely without railroad facilities. Much of the country, however, is arid or mountainous country, and it is probable that only the discovery of minerals in large quantities would justify new railroad building.

Utah has a population of 439,000, and has 2,137 miles of railroad. This is but 2.60 miles of railroad per hundred square miles of territory and 49.60 miles of railroad per 10,000 inhabitants. The completion of the Denver & Salt Lake as a through route, has been mentioned under the discussion of Colorado railroads. Almost the entire southern half of the state is mountainous and arid, and the Los Angeles & Salt Lake, which now runs southwest from Salt Lake City through the western central section of the southern half of the state, has almost no local traffic. As in the case of Oregon, the discovery of minerals in large quantities



might justify new railroad building, but it is doubtful if agriculture would ever be a justification for branch line feeders from any of the existing roads.

Arizona has a population of about 260,000. It has 2,410 miles of railroad or 2.12 miles per hundred square miles of territory and 95.15 miles per 10,000 inhabitants. Large sections of the state are arid desert, some of which, however, may in the future be reclaimed through irrigation. In the southeastern portion of the state, there are rich copper mines and the railroad building in the near future will probably be confined to extensions of railroads to mineral deposits.

California has a population of about 3,000,000. It has 8,440 miles of railroad or 5.42 miles per hundred square miles of territory and 28.96 miles per 10,000 inhabitants. In the northeast corner of the state, there is a square of territory about 100 miles each way, without railroad facilities. This country, however, is not now developed, and while in time one or more lines may be built into it, there would hardly seem, at present, to be a prospect for any immediate profit from such building. The southern portion of the state is well supplied with steam and electric railroads.

Nevada has few railroads and few inhabitants, the population being 109,000, but parts of the state are rich in mineral resources. There are now 2,318 miles of railroad in the state or 2.11 miles per hundred square miles of territory, but this is equivalent to 218.97 miles of railroad per 10,000 inhabitants. From Las Vegas at the junction of the Las Vegas & Tonopah and the Los Angeles & Salt Lake, it is nearly 200 miles to the southern extremity of the three branch lines which the Southern Pacific has dropped down south from its east and west lines across the northern section of the state. This central southern portion of the state is a desert valley between barren mountain ranges. Silver and gold have both been discovered in parts of this territory and railroad building will depend on the extent of these discoveries and the grade of ore found.

#### Northwestern District Offers Good Opportunities

The northwestern district includes Wisconsin, Minnesota, the northern half of Iowa and South Dakota, all of North Dakota, Montana, nearly all of Washington, and Idaho. This comprises a great wheat growing territory and the fruit raising districts on the Pacific coast. In most of this territory, it is fairly safe to assume that a wheat growing country more than twenty miles from the nearest railroad station will and should have additional railroad facilities. The Chicago, Milwaukee & St. Paul, the Chicago & North Western, the Northern Pacific, the Great Northern, and the Minneapolis, St. Paul & Sault Ste. Marie have in the past done considerable competitive railroad building in this territory.

Wisconsin has a population of 2,500,000 and 7,693 miles of railroad, or 13.95 miles per hundred square miles of territory, and 30.86 per 10,000 inhabitants. No county in the state is without a railroad, and all but three counties are served by two or more railroads. It would appear that no part of the state is now in need of new lines.

Minnesota has a population of 2,300,000, and has 9,152 miles of railroad or 11.32 miles per hundred square miles of territory and 40.31 miles per 10,000 inhabitants. The southern and central parts of the state are covered with a fairly close network of railroad lines, but in the northern counties, especially Chacohaing and Beltrami, there is a large area not served by railroads. Most of this land is, however, cut over timber land. It would be expensive and difficult to redeem it for agricultural purposes and it is now very sparsely settled. Railroad extension into it would be for the development of the territory rather than to meet already existing needs. There are still some opportunities for competitive railroad building. That is, there are some counties which are served now by only a single road, but which

might possibly support a branch line of some other railroad.

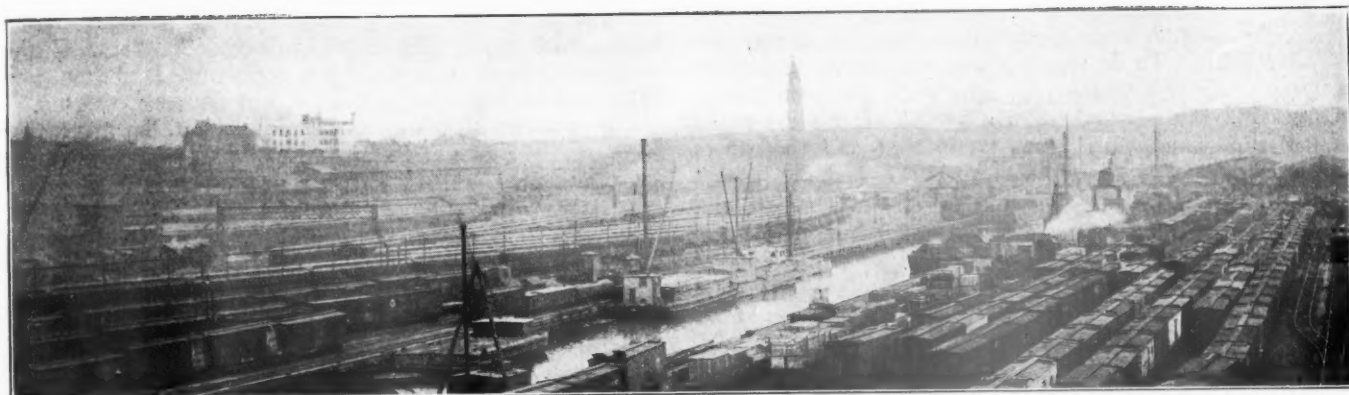
South Dakota has a population of a little over 700,000. It has 4,278 miles of railroad or 5.57 miles per hundred square miles of territory, and 61.72 miles per 10,000 inhabitants. The northwestern portion of the state has only two branch lines of the Chicago, Milwaukee & St. Paul extending west into it from the Missouri river. This leaves the counties of Perkins, Meade, Butte, and Harding almost without railroads. The territory however is rough and is not wheat country. Railroad building would be expensive and little likely to prove profitable in the near future.

North Dakota has a population of 752,000 and has 5,274 miles of railroad, or 7.52 miles per hundred square miles, and 72.09 miles per 10,000 inhabitants. The Great Northern, the Minneapolis, St. Paul and Sault Ste. Marie, and the Northern Pacific all have east and west main lines through the state and all have thrown off numerous branch lines to tap the wheat country. While there are points that are more than 20 miles from the nearest railroad, there are no large blocks of territory without railroad facilities. Some additional branch lines will probably be built but the total will amount to but a few hundred miles.

Montana has grown very rapidly in agricultural development in the last ten years. The estimated population in 1917 was 466,000. The total railroad mileage amounted to 4,847 or but 3.32 miles of railroad per hundred square miles of territory. This is an average, however, of 106.38 miles of railroad per 10,000 inhabitants. In the southeastern corner of the state, Carter and Powder River counties are without railroad facilities and in the northeastern and north central parts of the state, McCome, Garfield, Phillips and Valley counties have very little railroad mileage. A number of extensions of existing railroads have been discussed, and the state railroad commission has published a map showing proposed new roads. The principal ones are an extension of the branch line of the Great Northern from Hickey in Richla county, across the southern end of McCome county and the central portion of Garfield county, to connect with the eastern end of another branch of the same road which now runs east from Lewistown to Chipawa in Fergus county; a line from Dracut on the Chicago, Milwaukee & St. Paul, just west of Great Falls in Cascade county, west through the central portion of Lewis and Clark county, and across Powell county to Bonner just east of Missoula on the St. Paul; and a line from Allentown on the Montana Southern in Beaverhead county west and southwest through this county following the Hole river to Jackson.

Washington has a population of 1,600,000 and has 5,698 miles of railroad or 8.53 per hundred square miles of territory, and 37.58 miles per 10,000 inhabitants. The western portion of the state, with the exception of Jefferson county, is quite fully served with railroads, but in the central portion of the state in Okanogan, Ferry and Chelan counties, there are blocks of territory more than 50 miles square without railroad facilities.

Idaho has a population of 437,000. The state has 2,872 miles of railroad or 3.45 miles per hundred square miles of territory and 67.67 miles per 10,000 inhabitants. No county in Idaho is without railroad mileage, but there is a large section of the state without competing railroads. The Northern Pacific and the Chicago, Milwaukee & St. Paul serve the northern part of the state. From Grangeville, however, the southern terminus of a branch line of the Northern Pacific, southeast to the Western Pacific in Nevada—550 miles—and from Bend, Oregon, on the west to the Chicago, Burlington & Quincy in Wyoming—1,000 miles—there are only the lines of the Oregon Short Line and the Oregon, Washington & Navigation. These lines, which are part of the Union Pacific system, have their main line east and west with a number of feeder lines extending north and south.



## Production Is Limited by Lack of Freight Cars

Equipment Has Not Kept Pace with Growth of Traffic—  
800,000 Cars Needed in Next Three Years

**T**HE GREATEST freight car surplus ever recorded on American railroads occurred in March, 1919, when there were 450,000 cars idle. Today there is a serious shortage. In November a strike of bituminous coal miners was called, which lasted four weeks. Cars in storage were emptied, yet at the present time the operators report that their production is curtailed not by a shortage of labor but by a shortage of cars. Municipalities and states have appropriated funds for the greatest road-building program ever inaugurated, but railroad officers have stated that it will be necessary to postpone the work because sufficient freight cars are not available for carrying the necessary material. Throughout this country the cry is for increased production. How can production be increased if freight cars are not available to haul the raw material, or what would it avail if the finished product could not be distributed?

There is probably nothing which indicates more strikingly the failure of railroad facilities to keep pace with the expansion of the country's industries than the inadequacy of the supply of freight cars. In the years before the war the number of cars ordered usually served as a barometer indicating roughly the general business condition, the magnitude of the freight traffic and the earnings of the railroads. Since 1916 there has been an unprecedented volume of traffic, accompanied by acute car shortages, but the roads have been unable to purchase new equipment.

Some estimate of the amount of freight equipment that should have been bought during the past four years can be made by a comparison with the preceding period. Taking as a basis for comparison the years from 1905 to 1915, the records show that the ton-miles of freight carried increased from 186,463,109,510 in 1905 to 301,398,752,108, or 61 per cent in 1915, which was the year of largest freight traffic in this period of ten years. During the same period of ten

years, 1905-1915, the number of freight cars increased from 1,731,409 to 2,356,338, an increase of 624,929, or 36 per cent. In other words, the increase in the number of freight cars was 59 per cent as great as the increase in traffic. From 1915 to 1918 the freight traffic increased 45 per cent, yet during this period the number of freight cars in service increased only 36,532, or approximately 1.6 per cent. Assuming that the same rate of increase in the capacity of cars and the efficiency with which they were utilized prevailed

during both periods, the increase from 1915 to 1919 should have been 26.6 per cent, or approximately 607,000 cars for the Class I roads. This would indicate roughly that there is a shortage of about 570,000 cars.

### What Traffic Can Be Expected in the Future?

The actual requirements for freight cars are, of course, dependent on the future traffic. In the judgment of many of the most competent authorities the railroads of this country will have to handle more business in the next three years than ever before. Walker D. Hines, in an address before the American Railway Guild on November 18, said:

"As well as I can estimate the situation, I believe we are likely to have a large railroad traffic in this country for some

time to come. During the war many of the normal demands of the public had to go unsatisfied; there was much building which had to be postponed and many sorts of activities had to remain in abeyance. The opportunity has now come to satisfy those demands, and the building that is beginning to develop and the other activities which are now getting back to a normal basis create a demand for a very large railroad traffic. So I think the railroads must be prepared to handle a large business for a considerable period."

The isolated examples cited at the introduction to this article do not prove that there will be continued large demands for freight cars, except in so far as they are typical

**T**HE RAILROADS are at present unable to handle all of the traffic that is offered to them.

An analysis of the rate of growth in the past shows that while the present traffic is unusually heavy, further increases can be expected within the next few years.

Records of past performances indicate that the future business cannot be handled without serious shortages of equipment unless a great many additional cars are acquired.



of general conditions. There are some who contend that the traffic will decrease rather than increase during the next few years. To support this argument they cite the fact that the traffic during the past four years has been abnormally high. This is undoubtedly true as regards the traffic in 1916, 1917 and 1918. However, in 1918 and 1919 there has been practically no increase over 1917, and the present

the rate of increase can be foretold from previous census figures with a fair degree of accuracy. In Table II the estimated rate of increase in the population is shown from 1911 to 1922, based on previous census figures.

The number of ton-miles per inhabitant has fluctuated

TABLE I—FREIGHT TRAFFIC IN TON-MILES FROM 1888

1888	61,329,000,000	1905	186,463,000,000
1889	68,727,000,000	1906	215,878,000,000
1890	76,207,000,000	1907	236,601,000,000
1891	81,074,000,000	1908	218,382,000,000
1892	88,241,000,000	1909	218,803,000,000
1893	93,588,000,000	1910	255,017,000,000
1894	80,335,000,000	1911	253,784,000,000
1895	85,228,000,000	1912	264,081,000,000
1896	95,328,000,000	1913	301,399,000,000
1897	95,139,000,000	1914	288,320,000,000
1898	114,078,000,000	*1915	276,830,000,000
1899	123,667,000,000	*1916	343,099,937,805
1900	141,597,000,000	*1916 (calendar)	365,771,824,741
1901	147,077,000,000	*1917	397,935,177,017
1902	157,289,000,000	*1918	401,946,000,000
1903	173,221,000,000	†1918	398,442,019,620
1904	174,522,000,000		

\*Classes I and II.

†Class I.

Figures for the years 1908 to 1915, inclusive, do not include figures of switching and terminal companies.

volume of business is not greatly in excess of what might normally be expected, due to the steady increase from year to year.

There have been instances when the freight traffic decreased, notably in the period following 1893, in the fiscal year 1908, and more recently in 1914 and 1915. Nevertheless, the return of normal business conditions has always shown that, regardless of temporary disturbing factors, there are underlying conditions as unremitting as time itself which cause the normal traffic to increase annually at a fairly definite rate.

The ton-miles of traffic for the United States is plotted

TABLE II—POPULATION AND ANNUAL PERCENTAGE INCREASE

1888	60,493,646	
1889	61,781,699	
1890	63,069,756	
1891	64,362,238	
1892	65,654,719	
1893	66,947,201	
1894	68,239,682	
1895	69,532,164	
1896	70,824,645	
1897	72,117,125	
1898	73,409,607	
1899	74,702,088	
1900	75,994,575	
1901	77,612,569	
1902	79,230,563	
1903	80,848,557	
1904	82,466,551	1.962
1905	84,084,545	1.924
1906	85,702,533	1.888
1907	87,320,527	1.853
1908	88,938,527	1.819
1909	90,556,521	1.786
1910	92,174,515	1.755
1911	93,792,509	1.725
1912	95,410,503	1.696
1913	97,028,497	1.668
1914	98,646,491	1.640
1915	100,264,485	1.614
1916	101,882,479	1.588
1917	103,500,473	1.564
1918	105,118,467	1.539
1919		*1.516
1920		*1.493
1921		*1.472
1922		*1.451
1923		*1.430
1924		*1.411
1925		*1.392

\*Estimated.

from year to year, but the chart shows quite plainly that there is a general increase for each succeeding decade, despite the annual fluctuations. The ton-mileage per person that

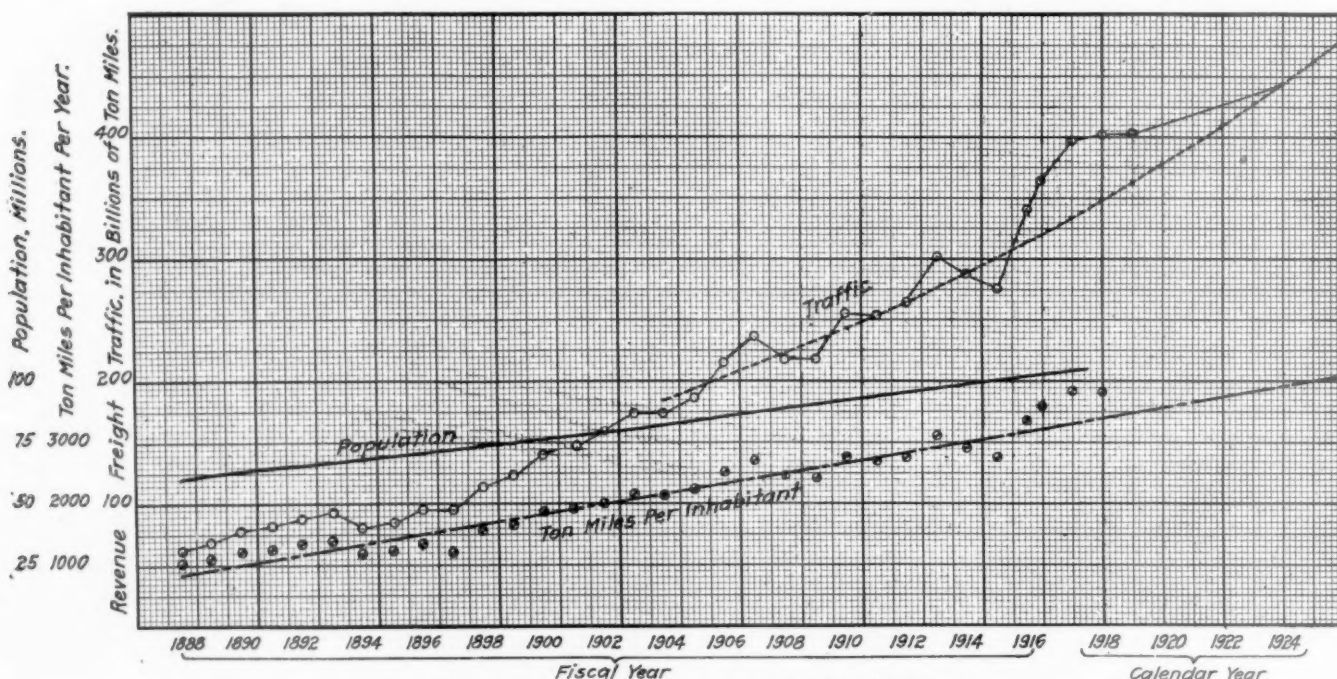


Fig. 1—Growth of Freight Traffic Since 1888

for every year since 1888 in Fig. 1. These data are also shown in Table I. On this chart there are also plotted the population (see Table II) and the ton-miles of freight traffic per inhabitant (Table III). This chart shows very plainly the cumulative increases in the freight traffic and the variation in the two factors which affect it. It will be noted that there are no unusual variations in the population; in fact,

might be expected under normal conditions is indicated by the dot and dash line. The actual traffic in 1917, 1918 and 1919 was considerably above the normal, as shown by the chart. These points have been practically disregarded in locating the normal lines, as they represent very unusual conditions. Figures above the normal can be expected for five or perhaps even ten years until the great volume of work deferred



because of the war has been taken care of, but ultimately the traffic should return approximately to this normal line. From the slope of the line the normal rate of increase for the period from 1911 to 1921 has been determined. This

Fiscal Year	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921
1888	1,013	1,112	1,207	1,243	1,342	1,398	1,476	1,555	1,655	1,861	1,895	1,970	2,145	2,120	2,215	2,520	2,710	2,455
1889	1,112	1,207	1,243	1,342	1,398	1,476	1,555	1,655	1,861	1,895	1,970	2,145	2,120	2,215	2,520	2,710	2,455	2,420
1890	1,207	1,243	1,342	1,398	1,476	1,555	1,655	1,861	1,895	1,970	2,145	2,120	2,215	2,520	2,710	2,455	2,420	2,770
1891	1,243	1,342	1,398	1,476	1,555	1,655	1,861	1,895	1,970	2,145	2,120	2,215	2,520	2,710	2,455	2,420	2,770	2,700
1892	1,342	1,398	1,476	1,555	1,655	1,861	1,895	1,970	2,145	2,120	2,215	2,520	2,710	2,455	2,420	2,770	2,700	2,770
1893	1,398	1,476	1,555	1,655	1,861	1,895	1,970	2,145	2,120	2,215	2,520	2,710	2,455	2,420	2,770	2,700	2,770	3,100
1894	1,476	1,555	1,655	1,861	1,895	1,970	2,145	2,120	2,215	2,520	2,710	2,455	2,420	2,770	2,700	2,770	3,100	2,920
1895	1,555	1,655	1,861	1,895	1,970	2,145	2,120	2,215	2,520	2,710	2,455	2,420	2,770	2,700	2,770	3,100	2,920	2,760
1896	1,655	1,861	1,895	1,970	2,145	2,120	2,215	2,520	2,710	2,455	2,420	2,770	2,700	2,770	3,100	2,920	2,760	3,370
1897	1,861	1,895	1,970	2,145	2,120	2,215	2,520	2,710	2,455	2,420	2,770	2,700	2,770	3,100	2,920	2,760	3,370	3,590
1898	1,895	1,970	2,145	2,120	2,215	2,520	2,710	2,455	2,420	2,770	2,700	2,770	3,100	2,920	2,760	3,370	3,590	3,840
1899	1,970	2,145	2,120	2,215	2,520	2,710	2,455	2,420	2,770	2,700	2,770	3,100	2,920	2,760	3,370	3,590	3,840	3,820
1900	2,145	2,120	2,215	2,520	2,710	2,455	2,420	2,770	2,700	2,770	3,100	2,920	2,760	3,370	3,590	3,840	3,820	
1901	2,120	2,215	2,520	2,710	2,455	2,420	2,770	2,700	2,770	3,100	2,920	2,760	3,370	3,590	3,840	3,820		
1902	2,215	2,520	2,710	2,455	2,420	2,770	2,700	2,770	3,100	2,920	2,760	3,370	3,590	3,840	3,820			
1903	2,520	2,710	2,455	2,420	2,770	2,700	2,770	3,100	2,920	2,760	3,370	3,590	3,840	3,820				

rate for the period given is approximately 2.63 per cent annually. Although the percentage of increase is decreasing from year to year and the rate given above would not be applicable for a longer period, the variation during the decade is so slight as to be almost negligible.

Since the rate of increase of the freight traffic is made up of two factors, (1) the rate of increase of the population and (2) the rate of increase of the ton-miles per inhabitant, it follows that with these two rates known the normal rate of increase in the traffic, which is the product of the two, can be determined. Furthermore, if the normal traffic for any year in the period is known, the normal traffic for the other years can be computed. The data on the normal freight traffic in this article are based on the ton-mileage for 1911, as this represents a fair average between heavy and light traffic. The normal rate of increase of the traffic, as calculated, varies progressively from 4.40 per cent in 1911 to 4.14 per cent in 1921. The traffic as computed from the basic factors is shown in Fig. 1 as a dotted line and is tabu-

Fiscal year—	Calendar year—
1904	1916
1905	1917
1906	1918
1907	1919
1908	1920
1909	1921
1910	1922
1911	1923
1912	1924
1913	1925
1914	1926
1915	
1916	

lated in Table IV. This has been extended ahead to 1926 in order to show the probable traffic in future years, and backward to 1904 to demonstrate how closely the rate of increase computed checks with the average traffic during the period from 1904 to 1911.

Since the actual traffic is considerably in excess of the normal traffic, the question naturally arises as to when the normal will be reached once more. As stated before, unusually heavy traffic can be expected for at least five years, and a line has therefore been drawn from the actual traffic of 1919 to the normal traffic for 1924. This should give a fair indication of the traffic that may be expected, disregarding abnormal factors.

#### Number of Cars Required

Having estimated the traffic to be expected, it becomes necessary to determine how many cars will be required to handle the business. The number of cars required to handle a given volume of traffic in the past would provide a basis for an estimate, but this would fail to take into account two important factors—namely, increased capacity per car and increased efficiency of utilization. Considering again the

period from 1905 to 1915, the Interstate Commerce Commission records show that the average capacity of freight cars increased from 30.7 tons to 40.6 tons, or 32.2 per cent.

The efficiency of utilization of freight cars depends on the average tons per loaded car and the average revenue car-miles per day. The product of these two is the revenue ton-miles per car per day. All these factors are available from the statistics of the Interstate Commerce Commission and are shown in Table V.

Year	Revenue car-miles per car per day	Tons per loaded car	Revenue ton-miles per car per day	Average capacity of car	Ratio, average load to capacity, per cent	Ton-miles per ton capacity per year
1905	16.3	18.1	298	30.7	59.0	3,500
1906	17.0	18.9	321	32.1	59.0	3,650
1907	16.5	19.7	325	33.7	58.5	3,520
1908	14.6	19.6	286	34.8	56.3	3,010
1909	15.0	19.3	290	35.3	54.7	3,000
1910	16.5	19.8	327	35.9	55.2	3,320
1911	16.0	19.7	315	36.9	53.4	3,120
1912	16.1	20.2	326	37.5	53.9	3,180
1913	17.2	21.1	363	38.3	55.1	3,460
1914	16.1	21.1	340	39.1	54.0	3,180
1915	15.2	21.2	328	39.8	53.2	3,000
1916	17.8	22.4	399	40.6	55.1	3,690
1916 (cal.)	18.5	23.8	422	41.0	55.6	3,760
1917	18.8	24.8	466	41.5	59.8	4,130
1918	17.6	26.6	469	41.9 (est.)	63.5	4,090
1919 (nine months)	15.2	27.9	425	42.2 (est.)	65.1	3,670

1913 to 1916 includes Class I and II roads only.  
1918 and 1919 includes Class I roads only.

It will be noted that the revenue car-miles per day has increased very little since 1905; in fact, the figure for the first nine months of 1919 is as low as any in the table, with one exception.

On the other hand, the tons per loaded car show a fairly steady increase, as might be expected, due to the increase in the average capacity of the cars. The ratio of the average load to the average capacity gives a measure of the percentage of the available capacity which is utilized. The table shows that there has been a comparatively small increase in the ratio between the average load and the average capacity. This naturally suggests that the ton-miles hauled in any given time for each ton of car capacity would be nearly constant. The ton-miles per year per ton of freight car capacity have been tabulated in the last column.

By referring to the chart of freight traffic it will be noted that the ton-mileage is high in years of abnormally heavy traffic, but decreases again when the business falls off. Although there is a considerable variation in the figures, from a minimum of 3,000 in 1909 and 1915 to 4,130 in 1917, there has been no general change over this period. During the first nine months of 1919 the traffic was handled at the rate of 3,670 ton-miles per ton of capacity per year, which corresponds very closely with the figure for 1906. All the data indicates that the variation from year to year is largely due to the relation between the demand for cars and the supply.

It is significant that the ton-miles per ton of capacity per year has been in excess of 3,500 for the yearly period whenever there has been a car shortage, and has been below 3,500 when ever there was an ample supply of cars. This is borne out in a very convincing manner by the statistics for the first nine months of 1919, shown in Table VI. From February until June the traffic was below the average for the remainder of the year. During that period the ton-miles per ton of car capacity fell below the rate of 3,500 per year and records showed a large surplus of cars, the excess of idle cars on May 1 amounting to 387,656. On August 1 the surplus was reduced to 88,000, which is a normal condition,

as about 100,000 idle cars are needed in order to fill requisitions for cars without undue delay.

The high efficiency of car utilization attained in recent months may be advanced as evidence to prove that in the

TABLE VI. CAR MILEAGE AND AVERAGE LOAD IN 1919, CLASS I ROADS ONLY

Month	Revenue car miles per car per day	Tons per loaded car	Revenue ton miles per car per day	Average capacity of car	Ton-miles per ton capacity per year
January .....	14.2	29.0	412	42.2	3,560
February .....	13.6	27.7	377	42.2	3,260
March .....	13.9	27.6	384	42.2	3,320
April .....	14.3	27.3	391	42.2	3,380
May .....	14.3	27.8	398	42.2	3,440
June .....	14.6	27.6	403	42.2	3,480
July .....	16.4	27.9	458	42.2	3,960
August .....	17.0	28.0	476	42.2	4,120
September .....	18.5	28.4	525	42.2	4,540

future heavier loading and greater mileage will prevail. This conclusion hardly seems warranted, however. The Car Service Section of the Railroad Administration has had broader powers than could be exercised by any similar body

are held beyond the free time. As cars become more plentiful this practice will tend to increase, and as the proportion of the time during which the car is in the possession of the shipper increases the miles per car per day will decrease. Unless the carload minimum weights can be increased, which is doubtful, there is sure to be a falling off in the average carload; in fact, during August, 1919, the average was three tons less than in August, 1918. With these points in mind, it seems reasonable to assume that when normal conditions are re-established the ton-miles per ton of car capacity per year will be practically the same as in the period from 1905 to 1915.

It is evident, since one ton of freight car capacity should be provided for every 3,500 ton-miles to be moved during the year, that the aggregate capacity of the cars should increase at the same rate as the traffic. This has not been the case, as is shown by the chart reproduced below (Fig. 2) and the data in Table VII. In the chart the ton-miles for each year are indicated by circles and the normal hauling

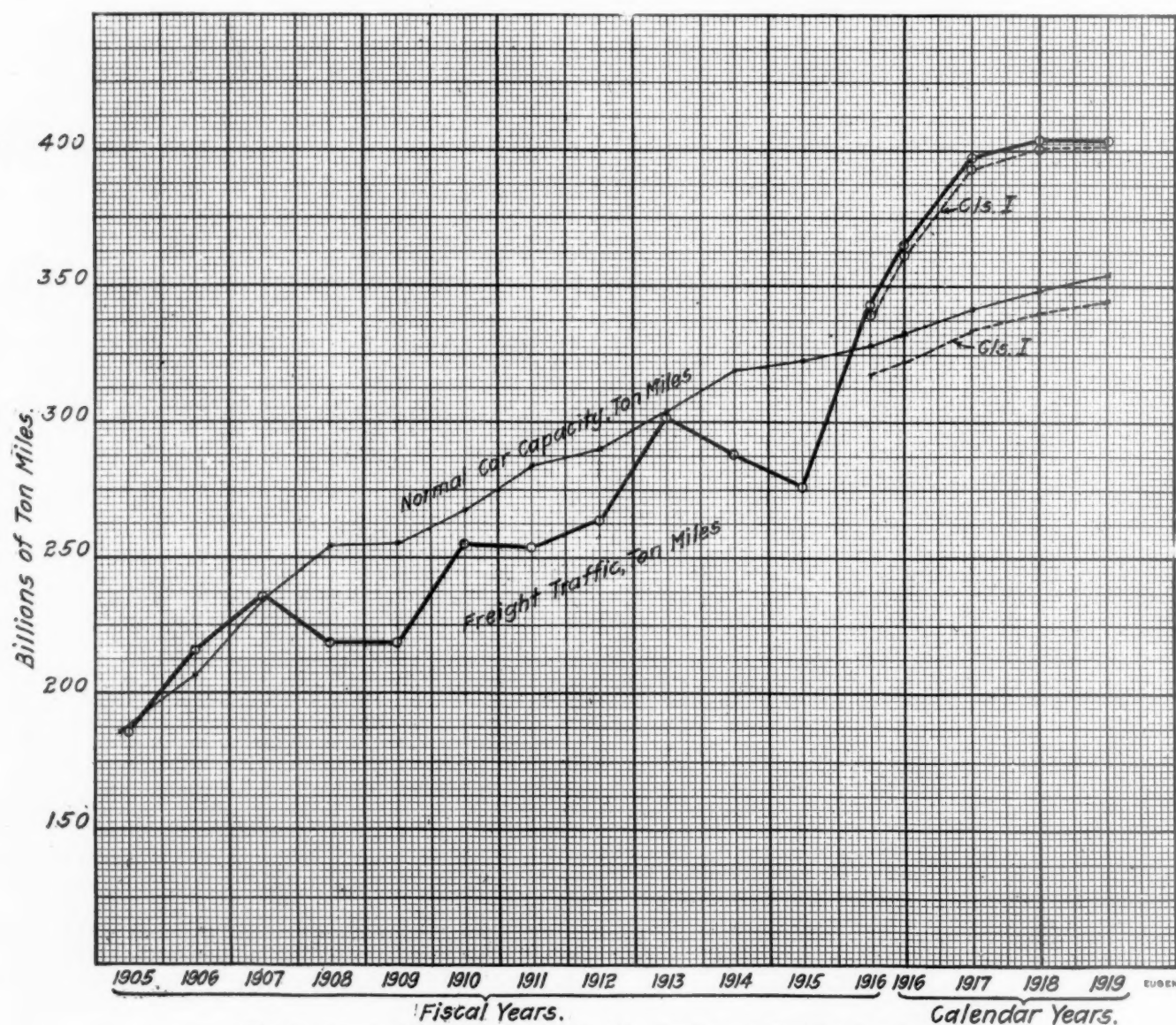


Fig. 2—Comparative Increases in Freight Traffic and Freight Car Capacity

under normal conditions. During the war shippers submitted to drastic car service regulations, many of which are still in effect, but could not be retained indefinitely without strong opposition from car users.

Even with the present high demurrage rates many cars

capacity of the equipment by dots. In 1906 and 1907 the car capacity was not as great as the traffic. During the years from 1908 to 1914 there was on the whole a plentiful supply of cars, which increased at a rate sufficient to keep a surplus during practically the entire period. Since that time,



however, the additions to the freight equipment have been far from adequate.

In the fiscal year 1914 the traffic fell off very markedly, and the number of freight cars ordered in that year was only 80,264. The fiscal year 1915 was also a period of

ments on roads owning 2,023,783 cars showed the status of retirements during 1915-1917 to be as follows:

**CARS WORN OUT AND DISMANTLED**  
(Cars retired in connection with rebuilding are not included.)  
ALL WOOD CARS

Class of cars	Number of cars	Average life of cars in years
Box	47,672	22.3
Stock	5,201	20.1
Flat	6,800	22.3
Gondola	24,630	18.0
Hopper	16,082	20.3
Refrigerator	4,591	21.7
Tank	81	24.6
Weighted average	105,057	20.9

It is significant that although the average age of the cars shown is 20.9 years, at the rate of retirement shown the equipment now in service would be replaced only at intervals of 55 years. The percentage of the total car equipment represented in this table is so large that the conditions which it discloses can be regarded as prevailing throughout the country. If this were the case it would indicate that the retirement of 120,000 cars which would naturally have been scrapped during the past three years has been deferred. The Railroad Administration has stated that of the 150,133 cars bad order on the fifteenth of November 19,300 were held out of service as not worth repairing. This is certainly a minimum figure. The deferred retirements amount to at least 100,000 cars, and although some of the box cars may be worth reinforcing and returning to service, not less than 75,000 cars should be scrapped.

The annual rate of acquisition of cars 21 years ago was approximately 120,000; therefore, at the present time this number must be retired each year unless the age of the cars in service is to be increased. The report of the Interstate Commerce Commission for December 31, 1917, showed that at that time the Class I carriers still had in service 904,007 freight cars not of all-steel or steel underframe construction. Until these light wooden cars have been scrapped the rate of retirement should certainly not be less than 120,000 cars per year. Assuming that 25 per cent of this equipment can be reinforced, there still remain 90,000 old cars to be destroyed during each of the next three years. The average capacity of the cars scrapped will be approximately 33 tons and the capacity of new cars 50 tons. Therefore, to replace the equipment ton for ton would require:

For deferred retirements	Cars
For normal retirements.....per year	49,500
	58,300

### Summary

Summing up the cars needed to make up deficiencies, to provide for future increases and to take care of retirements, the total amount of equipment required during the next three years is found to be as follows:

To make up the present shortage.....	Cars
To provide an adequate surplus.....	262,000
To take care of increases in traffic.....	100,000
To make up for deferred retirement.....	126,000
To care for normal retirements.....	49,500
	174,900
Total cars needed in three years.....	712,400
Annual requirements.....	237,500

This is a conservative estimate of the equipment needed only by the railroad companies of this country. The private car lines own about 200,000 freight cars and the Canadian roads have also about 200,000. If the new equipment needed by these car owners bears the same relation to the total number owned that prevails for the railroads in the United States, the car building plants of this country and Canada should be called upon to furnish 830,000 cars during the next three years.

### Type of Cars That Will Be Built

Few important innovations in freight car design have been introduced in the past decade, and the equipment built

TABLE VII—FREIGHT TRAFFIC AND CAR CAPACITY

Year	Freight traffic in ton-miles	Number of freight cars	Capacity of freight cars, tons	Capacity in tons x 3,500
Fiscal year—				
1905.....	186,463,109,510	1,731,409	53,255,083	186,200,000,000
1906.....	215,877,551,241	1,837,914	59,059,302	207,000,000,000
1907.....	236,601,390,103	1,991,557	67,033,324	235,000,000,000
1908.....	218,381,554,802	2,089,302	72,663,665	254,000,000,000
1909.....	218,802,986,929	2,073,606	73,137,546	256,000,000,000
1910.....	255,016,910,451	2,135,121	76,578,735	268,000,000,000
1911.....	253,783,701,839	2,195,511	81,077,028	284,000,000,000
1912.....	264,080,754,058	2,215,549	82,965,418	290,000,000,000
1913.....	301,398,752,108	2,273,564	86,978,145	304,500,000,000
1914.....	288,319,890,210	2,325,647	90,977,098	319,000,000,000
*1915.....	276,830,302,723	2,356,338	92,237,691	323,000,000,000
*1916.....	343,099,937,805	2,326,987	92,945,535	326,000,000,000
Cal. year—				
*1916.....	365,771,824,741	2,358,169	95,124,679	333,000,000,000
Fiscal year—				
1916.....	339,870,323,675	2,236,312	90,766,094	318,000,000,000
Cal. year—				
1916.....	362,444,397,129	2,253,111	92,280,335	323,000,000,000
1917.....	394,465,400,493	2,301,947	95,467,054	333,000,000,000

\*Includes Class I and Class II roads only.

Figures for the years 1908 to 1915, inclusive, do not include figures of switching and terminal companies.

business depression, and since 1916 higher costs and war conditions have reduced the purchases; consequently since 1914 there has not been a single year when the new cars bought have been sufficient to take care of the normal increase in traffic.

The Class I roads in 1918 had 2,323,324 freight cars, with an aggregate capacity of approximately 97,000,000 tons. The increase in capacity during 1919 has probably not been more than 1,500,000 tons, making the present capacity 98,500,000 tons. As the figures on which the chart is based include the Class II and Class III roads, which own about 2.7 per cent of all railroad freight cars, this capacity must be increased by that amount to make it comparable with the other statistics. This would bring the total capacity for all roads to 101,100,000 tons. Under normal conditions this capacity would be sufficient to handle an annual traffic of 354,000,000,000 ton-miles, but since the traffic in 1919 will amount to about 400,000,000,000 ton-miles it is evident that there is not enough equipment to handle it in a satisfactory manner. On the basis of 3,500 ton-miles per ton of capacity per year, the present traffic would require a car capacity of 114,200,000 tons, or about 13,100,000 tons more than is now available. As the average capacity of cars now built is 50 tons, this would indicate that 262,000 additional cars must be provided to make up for the present shortage.

In addition to this the railroads should arrange to provide for future increases in traffic and supply the necessary surplus of about 100,000 cars. Assuming that business will increase at a constant rate and will reach the normal in 1924, the annual increase will amount to 8,108,000,000 ton-miles, which would require a capacity of 2,320,000 tons. Assuming that the average capacity of the cars built will increase to 55 tons, this would require 42,000 cars. This is not representative of the number that would ordinarily be needed to care for the increase in the traffic, because the present traffic is high and therefore the assumed rate of increase for the next three years has been made correspondingly low. Under normal conditions about 100,000 cars would be needed to provide for the increase in traffic.

Aside from the question of providing for the traffic, there remains the need for retiring old equipment from service. As the demand for freight cars has been greater than the supply for more than three years, cars have been kept in service whenever it was possible and the number retired has been very low. A comprehensive study of the retire-



during the next few years will probably not be radically different from the types now in service. Box cars form a large percentage of the equipment and little further increase in capacity is to be expected, as the opinion seems to prevail that nothing is gained by increasing the capacity of box cars above 40 tons. In open-top equipment, however, there is a strong tendency toward the use of high-capacity units. Ninety-ton cars are by no means uncommon, and experimental cars of 105 and 110 tons' capacity have been constructed. The operating results secured with high-capacity cars have been satisfactory, and they will probably be built in greater numbers.

The trend of material prices will no doubt affect the character of the new construction. Since 1916 the cost of wood has increased relatively more than the price of steel, and as a result all-steel cars can now be built as cheaply as cars constructed partly of wood. In the past many roads have been willing to pay a considerably higher price for an all-steel car. Under present conditions there should be a much greater demand for all-steel construction.

A well-known manufacturer of automobiles, which among other things are remarkable for their light weight, recently stated that railroads could save enormous amounts by building cars of alloy steels of high tensile strength, thus materially reducing the dead weight hauled. This proposal has been investigated, but the study failed to disclose the opportunity for effecting great economies, and there is little prospect that alloy steels will be used in car construction.

Freight cars have not been exempt from the economic forces that have been operating since 1916, consequently the unit cost of the equipment which the railroads buy in 1920 will be greatly in excess of pre-war prices. The lowest scale of prices for freight cars in recent years was that prevailing in 1914 and 1915. At that time cars could be bought for \$800 to \$900. By 1916 they had advanced to \$1,100, in 1917 to \$2,100 and in 1918 the average was about \$2,850. The prices that will prevail during 1920 will depend on the cost of materials, and cannot be predicted with any degree of certainty. Under present conditions practically the same prices that existed in 1918 apply. It is probable that the 240,000 cars that should be built this year would cost between \$670,000,000 and \$700,000,000. Assuming that present prices continue the 712,000 cars needed in the next three years will involve an expenditure of approximately \$2,000,000,000.

## November Earnings Make Poor Showings.

**T**HE EFFECTS of the loss of traffic due to the coal strike and the extraordinary expenses incurred in meeting it as well as the general tendency of expenses to increase are reflected in the November earnings of the railroads as indicated by preliminary reports. Returns from 170 of the Class I roads, show a net operating income of only \$14,000,000. While the reports of the roads not included in this total may change the indication radically it is apparent from these figures that the showing for the month must be a poor one. The net operating income of the roads in federal control during the month of November in the test period averaged \$83,000,000.

Director General Hines on December 31 authorized the following statement:

"It will never be possible to estimate completely the losses which the country has sustained on account of the coal strike. Among the heavy losses are those which the Railroad Administration has sustained and will sustain on account of loss of business and the extraordinary difficulties which it was

compelled to overcome in order during the strike to give the public the most extensive operation of the railroads and the widest possible distribution of the available coal. These costly results will show in large measure in the month of November and again in December and probably to a substantial extent in January and even subsequent months. Undoubtedly there will be a very large deficit in operations in the month of November, most if not all of which would have been avoided but for the losses due to the coal strike.

"These losses were of two sorts. There was in November a heavy reduction in business due to the sudden diminution of the movement of coal which is the largest single item of traffic, and due in part to the shutting down or slowing down of other industries as they ran short of coal, and yet the temporary character of the loss of business was such as to preclude the possibility of any corresponding readjustment of operations so as to reduce operating costs. On the contrary, operating costs were seriously increased in many important respects. Only from 35 per cent to 45 per cent of the normal amount of coal was produced and yet this reduced production had largely to be transported over the most abnormal routes which had never been designed for the handling of coal in the direction and volume temporarily necessitated. Again the handling of railroad fuel was subjected to extraordinary burdens. Much coal which had been stored had to be reloaded, hauled to a new destination and again unloaded. In many instances coal had to be hauled hundreds of miles in order to supply railroad fuel, whereas ordinarily the needed coal supply was close at hand. For example, coal for Eastern Kansas and Oklahoma roads ordinarily obtained from Southeastern Kansas and Eastern Oklahoma had to be hauled from Pennsylvania and West Virginia. Much of the actual revenues which will be shown for November and also for December were for coal being handled at normal distances for railroad fuel so that the railroads using this coal in addition to handling this coal great and unusual distances on their own lines have to include in their operating expenses the freight received on this coal on other railroads and included in their operating revenues. In many parts of the country the railroads were suddenly confronted with the necessity of burning a character of coal to which the locomotives were not adapted and with which the firemen were not familiar, with the result that substantially less efficiency could be secured.

"It is important to emphasize that these results could not have been avoided by advance storage of coal because long prior to the strike being seriously threatened the general public demand for coal was so great that abnormal storage of railroad coal could not have been obtained except by depriving the general public correspondingly of coal which it was urgently seeking. The storage of railroad coal was already in excess of normal.

"In order to meet both railroad necessities and general public necessities, coal had to be switched to an unusual extent with resulting heavy terminal costs. These difficulties were seriously accentuated in the latter part of November and throughout the greater part of December by coal and stormy weather of almost unprecedented severity for the time of year in many parts of the country.

"In addition to the many millions of dollars of loss imposed in this way upon the public through the increased cost of railroad operation on account of the strike, there is the further unfortunate effect that railroad operations for November and December, and perhaps for a substantial period thereafter, will entirely lose their value as a measure of current railroad earning capacity."

A MALARIA SURVEY of the Central of Georgia right of way from Albany to Columbia, Ala., is now in progress under the direction of Dr. Abercrombie, of the State Board of Health of Georgia.



## Adequate Motive Power for Railroads a Necessity

Much Additional Power Required—Obsolete Locomotives  
Should Be Replaced with Modern Power

**A**N EXPENDITURE of approximately \$1,000,000,000 for new locomotives is necessary to furnish the motive power that will be required in the next three years by the railroads of the United States, to keep pace with the development of the country. The building program for that period should be very much more extensive than has been the case in recent years. New motive power must be provided to take care of the constantly increasing traffic and to replace obsolete and uneconomical locomotives that should be retired from service.

A conservative estimate, based on the average increase in railroad traffic and in the motive power during the decade ending with the year 1914, indicates that at least 698,000,000 lb. additional tractive power should be built between the present time and the end of the year 1922.

A striking phase of locomotive development during the period from 1905 to 1915 is that in addition to an increase of 34 per cent in the number of locomotives on American railroads, there also was an increase of 71 per cent in the aggregate tractive power. The manner in which the freight and passenger traffic and the motive power increased in the 10-year period and also the conditions that have prevailed since 1914 are shown in Table I.

Statistics of the Interstate Commerce Commission show that the average distribution of tractive power is 63.5 per cent in freight service, 20.5 per cent in passenger service, 14 per cent in switching service and two per cent unclassified.

The estimates of future requirements are based on these ratios, and the small percentage of new unclassified locomotives is included with those for freight service.

A great many locomotives have been continued in service during the war that probably would have been retired under normal conditions. At a low estimate the deferred retirements would amount to 5,000 locomotives and regular retirements to 7,000 locomotives of an average tractive power of about 24,000 lb. for the next three years. This makes a total of about 290,000,000 lb. of tractive power to be built to replace deferred and regular retirements.

Had the average tractive power of locomotives increased in recent years only at the same rate as in the decade just prior to the European war, the average tractive power of locomotives today would be 38,000 to 40,000 lb. and it would require about 18,000 of such units to furnish the amount of new motive power required. However, the tendency has been to greatly increase the power of each unit and on the

**R**APIDLY increasing traffic requires a large amount of new motive power.

An expenditure of \$1,000,000,000 for new locomotives in the next three years is necessary to prepare the railroads to handle the business of the country.

Locomotive building program must be expanded to provide 13,177 modern locomotives in three years and 12,000 obsolete locomotives should be retired from service.

Heavy power units promote economy of operation, reduce the cost of handling and repair of equipment.



basis of locomotives built recently it would require 7,542 freight locomotives of 60,000 lb. average tractive effort, 3,218 passenger locomotives of 44,000 lb. average tractive effort, and 2,417 switching locomotives of 40,000 lb. average tractive effort to handle the increase in traffic and to replace obsolete locomotives which should be retired during the next three years, making a total of 13,177 locomotives of modern design that should be built in the three-year period.

Locomotive development is influenced by traffic requirements and the type of new locomotives has necessarily varied with the character of the lines over which they were to run.

the decade of 5.46 per cent. This rate of increase if continued to the end of the year 1919 would have made a total freight traffic of 388 billion ton-miles. However, the statistics of the first ten months of the year 1919 and a conservative estimate of the probable volume of business for the months of November and December indicate that the actual freight business for the year will reach the enormous total of 402 billion ton-miles. These figures for the year 1919 may be taken as a basis on which to estimate the probable freight traffic for the next three years, which will probably reach 410 billion ton-miles in 1920, 418 billion ton-miles

TABLE I—FREIGHT AND PASSENGER TRAFFIC AND THE AVAILABLE MOTIVE POWER FROM THE FISCAL YEARS 1905 TO 1918.

Year	Number of Locomotives					Tractive Power				Freight Traffic (Ton Miles)	Passenger Traffic (Passenger Miles)	Percent Increase
	In U. S.	Percent Inc.	Percent Frt.	Percent Pass.	Percent Switch	Percent Unclass.	Aggregate, lb.	Percent Increase	Average Per Loco.			
1905	48,357	...	57.7	24.0	16.4	1.9	1,128,771,082	...	23,666	186,463,109,510	23,800,149,436	...
1906	51,672	6.9	57.8	23.7	16.4	2.1	1,260,633,673	11.7	24,741	215,877,551,241	25,167,240,831	6.0
1907	55,388	7.2	57.8	23.1	15.4	3.7	1,409,006,658	11.7	25,823	236,601,390,103	27,718,554,030	10.1
1908	56,733	2.4	59.7	23.2	15.4	1.7	1,477,758,536	5.0	26,384	218,381,554,802	29,082,836,944	4.9
1909	57,212	.8	59.3	23.3	15.4	2.0	1,503,971,444	1.8	26,634	218,802,986,929	29,109,322,589	.1
1910	58,947	3.0	59.3	23.2	15.5	2.0	1,588,894,480	5.1	27,282	255,016,910,451	32,338,496,329	11.1
1911	61,327	4.0	59.4	23.4	15.1	2.1	1,681,495,905	5.8	27,949	253,783,701,839	33,201,694,699	2.7
1912	62,262	1.5	58.8	22.9	15.0	3.3	1,746,964,128	3.9	28,634	264,080,745,058	33,132,354,783	d .2
1913	63,378	1.8	59.8	22.7	15.5	2.0	1,847,798,393	5.8	29,702	301,398,752,108	34,575,872,980	4.3
1914	64,760	2.2	59.8	22.6	15.5	2.1	1,931,953,982	4.5	30,420	288,319,890,210	35,258,497,509	2.0
†1915	63,850	...	...	...	...	...	2,014,201,500	4.3	...	276,830,000,000	32,384,247,563	d 8.2
†1916	65,021	...	...	...	...	...	2,075,519,800	4.0	...	343,099,937,805	34,213,596,127	5.7
†1917	63,828	...	...	...	...	...	2,145,698,000	2.4	...	365,771,824,741	39,476,858,549	15.4
†1918	64,410	...	...	...	...	...	2,196,648,349	2.4	...	401,946,000,000	42,566,342,892	7.8
1919	...	...	...	...	...	...	*2,461,533,854	12.1	...	*402,000,000,000	*45,600,000,000	7.1
1920	...	...	...	...	...	...	*2,600,359,600	5.6	...	*410,000,000,000	...	...
1921	...	...	...	...	...	...	*2,651,098,300	2.6	...	*418,000,000,000	...	...
1922	...	...	...	...	...	...	*2,708,979,400	2.1	...	*427,000,000,000	...	...

\*Estimated.

†1915 to 1918 Class I and II only.

The trend has been toward a heavy increase in the average tractive power of each unit. This has resulted in a much greater operating efficiency and was achieved only through the joint efforts of railroad engineers and locomotive builders.

If the normal rate of increase in motive power, which took place during the decade ending with the year 1914, had continued without interruption during the succeeding years, the aggregate tractive power available at the end of the year 1918 would have been about 2,430,000,000 lb. The actual aggregate tractive power available on December 31, 1918,

TABLE II—U. S. R. A. STANDARD LOCOMOTIVES

Type	Service	Lb. tractive power	Average
Light 4-6-2	Passenger	40,700	49,125
Heavy 4-6-2	Passenger	43,900	
Light 4-8-2	Passenger	53,900	
Heavy 4-8-2	Passenger	58,000	
Light 2-8-2	Freight	54,600	
Heavy 2-8-2	Freight	60,000	64,500
Light 2-10-2	Freight	69,400	
Heavy 2-10-2	Freight	74,000	
0-6-0	Switch	39,100	47,050
0-8-0	Switch	55,000	

Note—Mallet locomotives not included.

was 2,196,648,349 lb., a shortage of 235,600,269 lb. If the retirements of unfit and obsolete locomotives had been made at the same rate as in the years prior to 1914 this shortage would probably have amounted to 350,000,000 lb. The failure to retire from service such unfit units can only be justified by the exigencies of the war and now that this emergency has passed, all obsolete and uneconomical equipment should be retired with the least possible delay.

### Freight Locomotives

In the year 1905 the freight traffic of the United States totaled 186,463,109,510 ton-miles and this increased at a fairly constant rate until in 1914 it had reached a total of 288,319,890,210 ton-miles, an average yearly increase for

in 1921 and the stupendous total of 427 billion ton-miles in 1922.

To handle this vast amount of freight in 1920 it will be necessary to have an aggregate tractive power of 1,651,000,000 lb. in freight locomotives. This will require the building of a large amount of additional motive power. New freight locomotives to be built should average about 60,000 lb. tractive effort. That this average size of locomotives is

TABLE III—FREIGHT LOCOMOTIVES

Year	No. of locomotives in U. S.	Tractive power, lb.	Tractive power to be built, lb.	Tons carried one mile (ton-miles)	Ton-miles per year per lb. of tr. power
1905	27,869	716,769,000	...	186,463,109,510	260
1906	29,848	809,502,000	...	215,877,551,241	273
1907	32,079	894,719,000	...	236,601,390,103	265
1908	33,840	938,376,000	...	218,381,554,802	233
1909	33,935	955,051,000	...	218,802,986,929	229
1910	34,992	1,000,947,000	...	255,016,910,451	255
1911	36,405	1,067,749,000	...	253,783,701,839	238
1912	36,615	1,109,322,000	...	264,080,745,058	238
1913	37,924	1,173,351,000	...	301,398,752,108	257
1914	38,752	1,226,790,000	...	288,319,890,210	235
Average 59 per cent of total locomotives.					
1915	...	1,279,018,000	...	276,830,302,723	216
1916	...	1,317,855,000	...	343,099,937,805	260
1917	...	1,362,417,000	...	365,771,824,741	269
1918	...	1,394,871,000	...	401,946,000,000	288
1919	Required ...	*1,619,000,000	...	...	...
1919	In service ...	1,465,763,000	153,245,654	*402,000,000,000	262
1920	...	*1,651,228,353	32,218,090	*410,000,000,000	...
1921	...	*1,683,447,442	32,219,089	*418,000,000,000	...
1922	...	*1,719,693,918	36,246,476	*427,000,000,000	...
Total	...	...	253,929,309	...	...

\*Estimated.

a reasonable figure may be seen from Table II, giving the types and sizes of the standard locomotives designed and built under the direction of the Railroad Administration. There has been a great deal of criticism of these standard locomotives, but since they are the result of the joint efforts of a large number of practical railroad men and locomotive builders they are typical of the power that will be built for the more important roads. The average for all roads would be lower and it is quite probable that so far as the



tractive effort is concerned, the figures used in these estimates are not too high and represent the average locomotive that will be built in the immediate future.

The statistics of the Interstate Commerce Commission show that in the past years approximately 63.5 per cent of the total available tractive power was engaged in freight service and on that basis 248.3 ton-miles of freight were hauled during the year for each pound of tractive power of freight locomotives. The average ton-miles per year per pound of tractive power was somewhat in excess of 248.3 in 1918 and 1919, but an average taken over the entire period of 14 years from 1905 to 1918 was only 251.1 ton-miles per year per pound of tractive power. This average is subject to fluctuation and as will be seen in the tabulations the average ton-miles per pound of tractive effort in 1906 reached the extremely high figure of 273 ton-miles, but dropped to 235 ton-miles in 1914. It is for this reason that an average for a ten-year period during normal times is taken as a basis for

comotives an additional 8,091,000 lb., so that it will require an aggregate increase of 452,490,000 lb. tractive power in freight locomotives in three years. This makes a total to be built of 7,542 units of 60,000 lb. average tractive effort. As heavy freight locomotives cost approximately \$82,000 in 1918, and it is quite probable that this price will continue, the total cost of freight locomotives required in the next three years will be \$618,444,000. This is a yearly average of 2,514 freight locomotives costing \$206,444,000.

#### Passenger Locomotives

The passenger traffic of the railroads of the United States during the decade ending with the year 1914 increased 11,458,246,073 passenger-miles or 48 per cent. During this same period the number of passenger locomotives increased only 25.8 per cent, but as in the case of freight locomotives the average tractive power increased rapidly.

The passenger locomotives in service in the year 1914 were

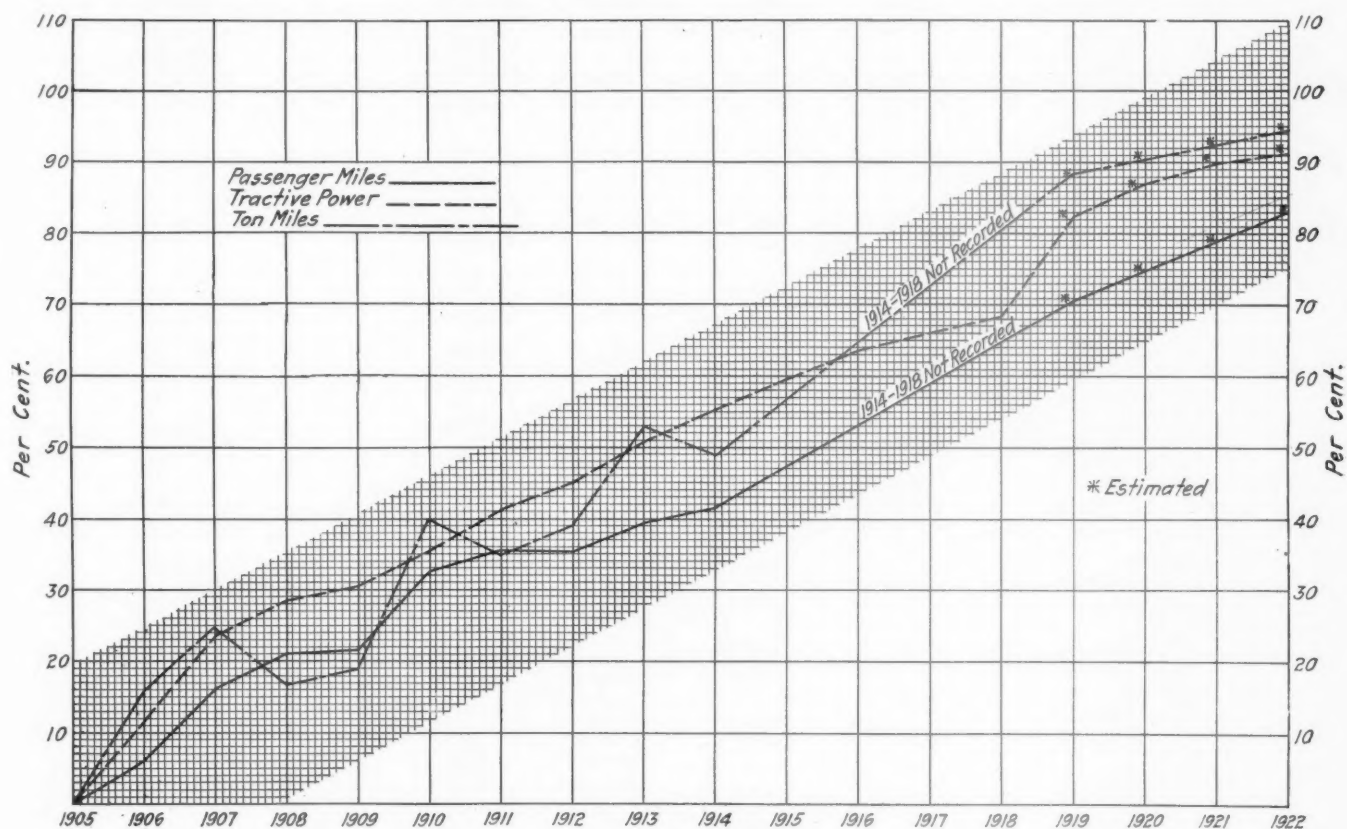


Chart Showing Comparative Increase in Tractive Power and in Freight and Passenger Traffic

calculating the work that will probably be done in the future. This average may be improved upon, but there is no certainty that such will be the case.

As already stated, the estimated freight traffic for the year 1920 will be 410 billion ton-miles and to haul it will require freight locomotives having an aggregate tractive power of 1,651,228,000 lb. As will be seen in Table III, 153,245,000 lb. additional tractive effort was needed to bring the aggregate for 1919 up to the proper point and to this amount must be added 32,218,000 lb. necessary to provide for the increase in freight traffic in 1920. The increase in freight traffic to 418 billion ton-miles in 1921 will require an increase of 32,219,000 lb. tractive power and the increase to 427 billion ton-miles in 1922 an additional 36,246,000 lb. Normal and deferred retirements of freight locomotives during the next three years make it necessary to provide 190,472,000 lb., and the proportional increase in unclassified lo-

23 per cent of the total number of locomotives and the aggregate tractive effort amounted to 396,051,000 lb. or 20.5 per cent of the total for all classes. No figures being available as to the actual aggregate tractive effort engaged in passenger traffic in recent years it may reasonably be assumed that the same ratio that existed in 1914 (20.5 per cent), will apply. On that basis the passenger traffic for the year 1919 would have required 521,669,000 lb. tractive power, but as will be seen in Table IV the total available power was only 473,199,000 lb.

The total available tractive effort on December 31, 1918, being 2,196,648,349 lb. and assuming that 20.5 per cent of this amount was engaged in passenger traffic, this additional tractive effort required for passenger service to bring the total for the year 1919 up to normal would be 48,470,000 lb., and with the increase computed on the basis of 20.5 per cent, 11,404,000 lb. are required for 1920, 10,401,000 lb.

for 1921 and 11,702,000 lb. for 1922. To replace the normal and deferred retirements of obsolete passenger locomotives 59,613,000 lb. are required, making a total increase of 141,601,000 lb. tractive power required to be built for passenger service in the next three years.

This would require a total of 3,218 units of 44,000 lb. tractive power each and as the probable cost of passenger

40,000 lb. tractive power as an average for this class of locomotives this would require 2,417 units, and at an average cost of \$40,000 each, the total cost of switching locomotives to be built in the next three years would be \$96,680,000, or a yearly average of 806 locomotives at a cost of \$32,226,666, which represents the requirements of this class of the service.

### Summary

The total increase in the aggregate motive power required in the next three years and the estimated cost is as follows:

Year	Number of locomotives in U. S.	Tractive power, lb.	Tractive power to be built, lb.	Passenger-miles
1905	11,618	231,398,000		23,800,149,436
1906	12,249	258,430,000		26,167,240,831
1907	12,814	288,846,000		27,718,554,030
1908	13,185	292,960,000		29,082,836,944
1909	13,317	308,314,000		29,109,322,589
1910	13,660	325,723,000		32,338,496,329
1911	14,301	344,707,000		33,201,694,699
1912	14,262	358,127,000		33,132,354,783
1913	14,396	378,798,000		34,575,872,980
1914	14,612	396,051,000		35,258,497,509
Average, 23.2 per cent of total locomotives				
1915		412,911,000		32,384,247,563
1916		425,491,000		34,213,596,127
1917		439,868,000		39,476,858,549
1918		440,312,000		42,566,342,892
1919		473,199,081	48,470,081	45,600,000,000
		In service 521,669,000		
		Required *533,037,718	11,404,427	
1920		*543,475,151	10,401,433	
1921		*555,176,777	11,701,626	
1922				
Total			81,977,567	

\*Estimated.

locomotives will approximate \$60,000 each, it will necessitate a total expenditure of \$193,080,000 for this purpose during the next three years.

### Switching Locomotives

As shown in Table I, 15.6 per cent of the total number of locomotives in service were switching locomotives and on the basis of 14 per cent of the aggregate tractive power there were 323,160,000 lb. of tractive power in switching service in the year 1919. Additional power of 33,785,000 lb. tractive effort are required to bring the switching service to its proper proportions and this amount should be constructed

Normal increase in lb. tractive power:	
Freight locomotives	261,928,000
Unclassified locomotives	8,099,000
Passenger locomotives	81,988,000
Switching locomotives	55,985,000
Total	408,000,000
Deferred and normal retirements in lb. tractive power:	
Freight locomotives	190,472,000
Passenger locomotives	59,613,000
Switching locomotives	40,712,000
Total	290,797,000
Cost of replacing retirements:	
3,175 freight locomotives	\$260,350,000
1,332 passenger locomotives	79,920,000
1,017 switching locomotives	40,680,000
Total	\$380,950,000
Cost of retirements when built:	
9,320 freight and unclassified locomotives	\$142,400,000
2,760 passenger locomotives	41,700,000
1,920 switching locomotives	21,300,000
Total	\$205,400,000

	Tractive power, lb.	No. of locomotives	Cost
Normal increase and retirements	407,999,000	7,653	\$527,254,000
Deferred retirements	290,797,000	5,524	380,950,000
Total	698,796,000	13,177	\$908,204,000
Average per year for three years	232,599,000	4,392	302,735,000

The cost of locomotives to be retired is taken as equal to the cost in the year 1905, when freight locomotives cost \$15,250, passenger locomotives \$15,100 and switching locomotives \$11,100. This will retire from service locomotives costing \$205,400,000 when built and the capital expenditures of the railroads for locomotives will therefore be \$702,804,000 in the next three years, as shown below:

Total cost of locomotives to be built in three years	\$908,204,000
Total cost of locomotives to be retired in three years	205,400,000
Addition to capital expenditures	\$702,804,000

The total number of locomotives that should be built in the next three years is 13,177 and the total to be retired is 12,000 locomotives, making an increase of 1,177 in the number of locomotives. This number of retirements seems large as compared with the number estimated to be built, but this is accounted for by the greatly increased power of the individual units.

This policy would be beneficial in facilitating the movement of the traffic and also in keeping down repair costs and labor charges for crews and hostlers. A large locomotive can be coaled, watered, or repaired in practically the same time as a small one and having 60,000 lb. tractive power in one unit requires only one engine crew, while two units each of 30,000 lb. tractive power would require practically twice the expenditure for upkeep and operation.

This total expenditure of practically one billion dollars for new motive power is necessary if the railroads are to be prepared to handle the business of the country. It is essential that the need for additional motive power be given immediate consideration and the locomotive building program arranged for.

Over 600 cars of fuel will be sent from Ashland, Wis., to interior villages as a result of the demolition of the wooden ore dock of the Minneapolis, St. Paul & Sault Ste. Marie, at Ashland, which has lately been begun. The road has now a solid steel and cement ore dock, finished two years ago at a cost of about \$1,000,000. A saw mill has been set up to convert the timber in the old dock into stove-wood.

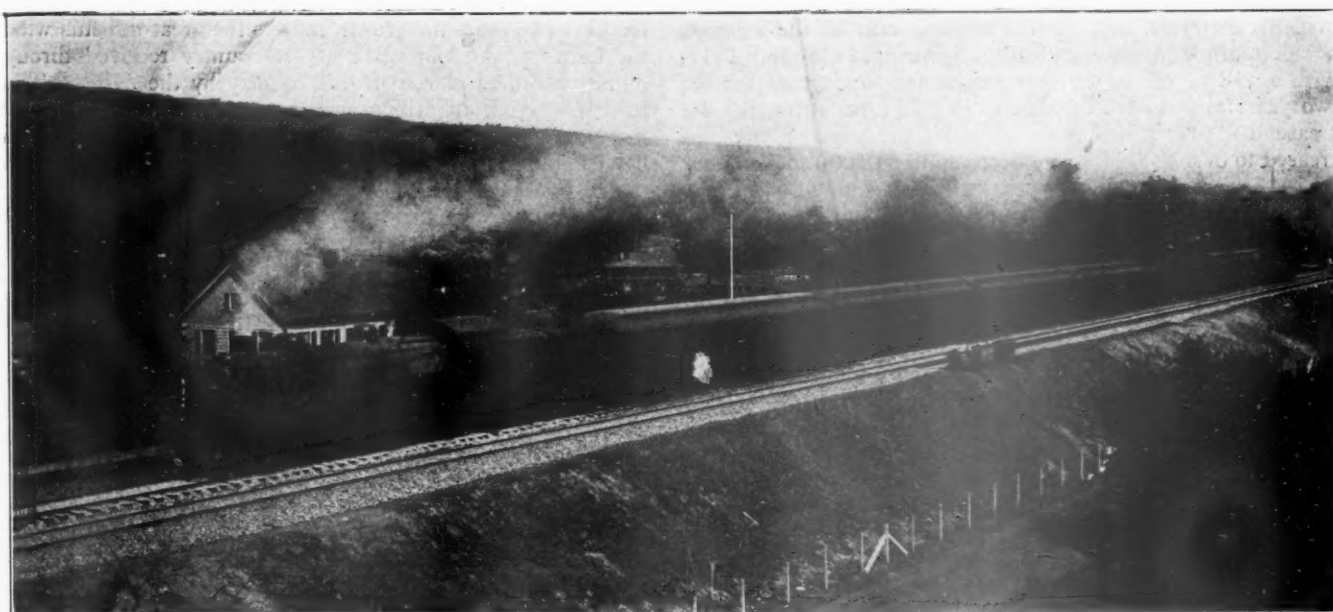
Year	Number of locomotives in U. S.	Tractive power, lb.	Tractive power to be built, lb.
1905	7,923	158,028,000	
1906	8,485	176,488,000	
1907	8,529	197,260,000	
1908	8,783	206,886,000	
1909	8,837	210,555,000	
1910	9,115	222,445,000	
1911	9,297	235,409,000	
1912	9,311	244,574,000	
1913	9,834	258,691,000	
1914	10,685	270,473,000	
1915		281,988,000	
1916		290,572,000	
1917		301,397,000	
1918		307,530,000	
1919		323,160,348	33,784,534
		On service 356,944,882	
		Required *364,050,344	*7,105,462
1920		*371,253,762	*7,203,344
1921		*379,145,116	*7,891,354
1922			
Total			55,984,694

\*Estimated.

in the year 1920. To meet the normal increase in traffic in 1920 will require 7,105,000 lb., the increase in 1921 will require 7,203,000 lb. and in 1922 it will require 7,891,000 lb. additional tractive power.

Table V shows the number of switching locomotives in service from 1905 to 1914 and the increases in aggregate tractive power required in 1920, 1921 and 1922. Besides these increases, the deferred and regular retirements of switching locomotives to be replaced with modern power will require 40,712,000 lb., making necessary a total increase of 96,696,000 lb. tractive effort in the next three years. Taking





## 24,500 Passenger Cars Needed in Next Three Years

With Remarkable Traffic Increase, Purchases Have Not Met  
Needs for Retirements Alone Since 1915

**I**N THE TEN-YEAR PERIOD ending June 30, 1915, the volume of passenger traffic on the railroads of the United States, as measured by the number of passengers carried one mile, increased 48 per cent. During this period the requirements of the increasing business were so closely met by the addition of new equipment that the average number of passengers per car never reached 16 nor dropped below 15. This required the purchase during the 10 years of 26,800 passenger train cars.

In the four and one half years since June 30, 1915, the number of passengers carried one mile has increased over 43 per cent, less than 4,000 cars have been purchased, and in 1919 there were an average of 21 passengers for every passenger carrying car of railroad ownership moved in revenue service. To provide for the present volume of passenger traffic on pre-war standards of service, without allowance for retirements, would require over 18,000 more passenger train cars than the railroads now own.

### Conditions Prior to 1915

In Table I are shown the volume of passenger traffic, the number of passenger car miles and the number of passenger cars in service for each of the ten years prior to June 30, 1915. During 1905 the total revenue passenger movement was 23,800,149,436 passengers carried one mile. In 1915 there were 32,384,247,563 passengers carried one mile, representing a net increase at the end of the period of 8,584,098,127. With two exceptions during this period the trend of passenger traffic was steadily upward. During 1912 there was

a slight decline in the amount of traffic, while in 1915 the decrease over the previous year was very large, amounting to 2,874,249,946 passenger miles. This reflects the general business depression following the outbreak of the European war and as a real measure of the trend of passenger traffic

during the period, the difference in volume between 1905 and 1914, when the peak was reached, should be used. This is 11,458,348,073, or a 48 per cent increase.

From 1908, the first year for which car mile statistics are available, the number of passengers per car remained remarkably constant—between 15 and 16. The minimum ratio of 15 occurred in 1912, a year of comparatively light traffic, and the maximum of 15.8 was reached in 1910, the year in which occurred the greatest increase in passenger mileage of any during the period. Another correlative fact of great interest indicated by this table is the close relation between the annual fluctuations in the volume of passenger business and the increases in the number of passenger train cars, the nature of each

change in traffic being reflected by the increase in the number of cars in service during the next year.

During the eight years beginning with 1908 each passenger carrying car averaged about 61,500 miles per year. This average, however, is not a true reflection of the annual mileage per car during the period because of the comparatively low mileage during 1908, 1909 and 1915. During 1910, 1911 and 1912, the miles per car remained fairly constant with traffic showing a declining tendency and bet-

**I**N 10 YEARS to June 30, 1915, passenger traffic increased 48 per cent. The number of passenger cars increased 35 per cent.

In the four and one-half years since, traffic has increased over 43 per cent, but equipment has increased only 2.5 per cent.

There is a heavy shortage of passenger cars now.

To restore 1917 standards in three years would require the purchase of over 8,000 cars a year until 1923.

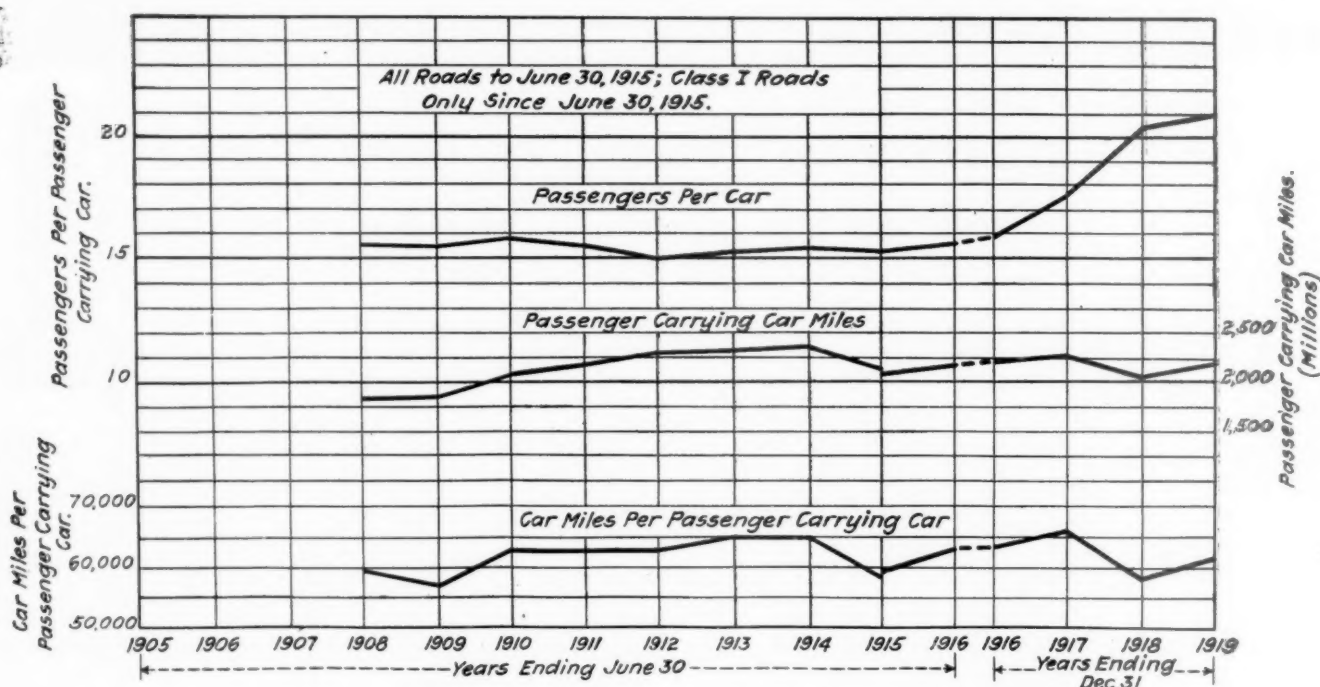
ter than an average increase in new equipment. It seems evident, therefore, that such a mileage can, on the average, be maintained without difficulty. During 1913 and 1914, with a falling off in the increase in new equipment for the two years and material increases in traffic following the decrease of 1912, the number of miles per car per year increased to over 64,000. The decrease to 58,200 miles per car in 1915, accompanying the marked falling off of passenger business, indicates an actual surplus of equipment during that year.

During the ten calendar years ending with 1914, the *Railway Age* reports a total number of passenger cars ordered of approximately 22,900, of which 78 per cent were for the steam railroads of the United States. During the same period *Railway Age* statistics show a total of approximately 34,400 passenger cars actually built in the United States and Canada. While it is evident that the statistics for the number of cars ordered is not as complete as for the number of cars built, it is reasonable to assume that approximately the same proportion in each case were for use on

there was a rapid recovery of business activity and during the next two years the growth reflects the great impetus which the industry and commerce of the country received through munition orders placed in this country by the Allies. Then in 1917 began the troop movement which continued with increasing volume during the early months of 1918 and was not completed until the middle of 1919, at which time the return movement was practically completed. Following the signing of the armistice there was an immediate increase in the volume of civilian travel for pleasure, which had been considerably curbed during the war.

During the first year and one half of this period there was actually less passenger equipment in service than at the beginning of the period and at the end of 1917 there were only about 300 more passenger cars in service than were shown for the fiscal year 1915. For the whole period of four and one half years, with its increase in volume of passenger business of over 43 per cent, the number of passenger cars in service increased by 2.5 per cent.

While the number of cars ordered during the four calen-



The Number of Passengers Per Car, Passenger Carrying Car Miles, and Miles Per Car, 1908 to 1919

the steam railroads of the United States. On this basis it is evident that the railroads must have received about 26,870 new passenger train cars during the ten years from 1905 to 1915. But during this time the actual number of cars in service increased only 14,063 and it is evident that about 12,800 cars must have been retired. The yearly average for the ten years is, therefore, 2,687 new cars purchased, of which 1,280 replaced old cars retired from service and 1,406 were added to take care of the traffic increase.

#### The War Period

During the four and one half years since June 30, 1915, passenger miles have increased 13,810,000,000, or 43.5 per cent. This is a larger proportionate increase than that for the ten years prior to 1915 and but slightly less than the actual maximum increase during the period from 1905 to 1914. There have been a number of extraordinary conditions contributing to this rapid increase in the volume of passenger business which make it evident that such a rate of increase could hardly have been expected under normal conditions. Following the depression of 1914 and 1915

car years ending with 1918 was approximately 7,000, only 45 per cent of this number were for use on the steam railroads of the United States. Applying the same percentage to the approximately 7,490 cars built during the four and one-half years prior to December 31, 1919, only 3,370 passenger train cars were built for steam railroad use in the United States. As at least half of the cars built in 1915, or about 440, were probably in service prior to July 1, the beginning of the period under discussion, the number of new cars actually placed in service in the four and one half years probably did not exceed 2,930. As the number of passenger cars in service increased but 1,310 during the period, it is evident that about 1,620 cars were retired. An average of only 652 new cars were received by the roads annually, of which 360 were replacements and 291 were additions to the passenger carrying equipment of the country.

Comparing the years up to 1918, as shown in Table II, there is evident a growing inability of the equipment available to meet the heavy increase in traffic, which is shown by the increase in the number of miles per passenger carrying car per year from 59,600 in 1915 to 66,000 in 1917 with



a corresponding increase in the number of passengers per car from 15.3 in 1915 to 17.6 in 1917.

In 1918 there was a sharp decrease in car mileage due to the curtailment of service effected by the Railroad Administration. This and an increase in the number of cars in service of 961 resulted in lowering the average car miles per passenger carrying car from 66,000 to 58,600, but the number of passengers per car increased from 17.6 to 20.4 by far the largest increase ever recorded. Of course, the heavy troop movement, which was practically continuous throughout the year 1918, tended to increase this figure above that

passenger business there would still have been a rapidly growing shortage of equipment.

### How Many Passenger Cars Are Needed?

The facts reflected by these figures have been firmly established in the mind of the traveling public for some time and statistical data is not needed to substantiate them. The data does, however, afford a basis on which to arrive at a reasonable estimate of the actual amount of new equipment which must be purchased before passenger service can be restored to a standard at all approaching that

TABLE I—PASSENGER TRAFFIC, PASSENGER EQUIPMENT IN SERVICE AND EQUIPMENT MOVEMENT DURING THE 10 YEARS ENDING JUNE 30, 1915, FOR ALL STEAM RAILROADS OF THE UNITED STATES

Fiscal year	Passengers carried one mile		Passenger carrying car miles		Passenger per car	Passenger train cars in service		Passenger carrying cars in service	Passenger miles per pass. carrying car	Car miles per pass. carrying car
	For the year	Increase from last year	For the year	Increase† from last year		For the year	Increase over last year			
1905	23,800,149,271					40,713		29,149	819,000	
1906	25,167,240,831	1,367,091,395				42,262	1,549	30,116	836,000	
1907	27,718,554,030	2,551,313,199				43,973	1,711	30,980	895,000	
1908	29,082,836,944	1,364,282,914	1,867,984,570		15.6	45,117	1,144	31,440	931,000	59,400
1909	29,109,322,589	26,485,645	1,881,022,085	13,037,515	15.5	45,584	467	31,926	915,000	57,200
1910	32,338,496,329	3,229,173,740	2,048,597,509	167,575,424	15.8	47,095	1,511	32,702	988,000	62,700
1911	33,201,694,699	863,198,370	2,141,382,030	92,784,521	15.5	49,818	2,723	34,233	974,000	62,600
1912	33,132,354,783	—69,339,916	2,202,843,085	61,461,055	15.0	51,490	1,672	35,139	944,000	62,800
1913*	34,575,872,980	1,443,518,197	2,253,797,814	50,954,729	15.3	51,700	210	34,761	997,000	64,800
1914*	35,258,497,509	682,624,529	2,295,120,978	41,323,164	15.4	53,466	1,766	35,545	986,000	64,600
1915*	32,384,247,563	—2,874,249,946	2,120,335,744	—174,785,234	15.3	54,776	1,310	36,529	889,000	58,200
Net increase over 10 years		8,584,098,127	Average		15.4	Total incr'se 14,063		Approx. average 950,000		Approx. average 61,500
Per cent net increase...		36.				Per c. incr'se 34.6				
Maximum increase during the period (1914)....		11,458,348,073								
Per cent maximum increase		48.2								

\*Excludes Class III roads and switching and terminal companies.

†Decrease indicated by minus sign.

representing conditions prevailing in the handling of regular passenger business. The aggregate of this troop movement for the 22 months from January 1, 1918, to November 1, 1919, however, was 5,917,658,719 passenger miles, or only 14 per cent of the total volume of passenger business of the year 1918 alone, and can hardly have exercised a predominating influence on the average. Its effect may practically be eliminated by comparing 1917 with 1919, as the troop movement during these two years was confined to about one half of the year in each case, and here the increase is shown to have been over three passengers per car.

The sharp decline in passenger car mileage showing an

so steadily maintained during the eight years prior to the outbreak of the European war.

Passenger equipment may be divided roughly into two major classes: (1) passenger carrying cars and (2) express, baggage and postal cars. In the tables already referred to are given a clear presentation of the volume of passenger traffic and the total number of passenger carrying car miles to handle the traffic. This forms a fair basis for determining the needs for passenger carrying cars if the assumption is made that there has been no great change in the relative amount of car mileage made by equipment of railroad ownership and Pullman sleeping and parlor cars, or that there

TABLE II—PASSENGER TRAFFIC, PASSENGER EQUIPMENT IN SERVICE AND EQUIPMENT MOVEMENT DURING THE 4½ YEARS ENDING DECEMBER 31, 1919, FOR CLASS I RAILROADS OF THE UNITED STATES

Fiscal year	Passengers carried one mile		Passenger carrying car miles		Passenger per car	Passenger train cars in service		Passenger carrying cars in service	Passenger miles per pass. carrying car	Car miles per pass. carrying car
	For the year	Increase from last year	For the year	Increase† from last year		For the year	Increase over last year			
1915	31,789,928,187		2,078,812,953		15.3	52,690		34,852	913,000	59,600
June 30, 1916	33,645,908,150	1,855,979,963	2,155,597,720	76,784,767	15.6	51,670	—1,020	34,180	986,000	63,100
December 31, 1916	34,585,952,026	*2,796,023,839	2,178,152,768	*99,339,815	15.9	52,179	*511	34,261	1,008,000	63,600
1917	39,476,858,549	4,890,906,523	2,235,006,367	56,853,599	17.6	52,977	798	33,923	1,163,000	66,000
1918	42,676,741,000	3,199,882,451	2,084,502,591	—150,503,776	20.4	53,938	961	35,639	1,195,000	58,600
1919‡	45,600,000,000	2,923,300,000	2,185,000,000	100,500,000	20.8	54,000	62	35,670	1,278,000	61,400
Increase over 4½ years		13,810,071,813	Increase			1,310				
Per cent increase.....		43.5	Per cent increase			2.5				

\*Increases from the year ending June 30, 1915.

†Decreases indicated by the minus sign.

‡Estimated. Passenger miles and car miles are based on Railroad Administration reports up to September 30, and October 30, respectively, by assuming that the proportion for the remainder of the year to the total will be the same in 1919 as in 1918.

average of 58,600 and 61,400 miles per car per year, respectively, for 1918 and 1919 following the high mileage during 1917, raises the question as to whether the change in conditions is actually due to a shortage of equipment or entirely to the war policy of the Railroad Administration. Assuming, however, that the equipment had been used to the same extent during these two years as it was during 1917, so that each passenger carrying car had averaged 66,000 miles for the year, the number of passengers per car would have increased to 18.1 in 1918 and 19.3 in 1919, clearly demonstrating that even under normal methods of handling

has been no material increase in the carrying capacity of passenger cars of railroad ownership. The remarkable uniformity of the number of passengers per car during the eight years prior to June 30, 1915, would indicate that these are reasonable assumptions. At the end of that period there were 10,884 passenger train cars of all-steel construction and 5,197 with steel underframes, a total in both groups of 38 per cent of the equipment in service, practically all of which had been built during that period, with no marked effect on the average car load.

The only measure of the expansion of express and postal

business is the increase in revenue reported by the railroads to the Interstate Commerce Commission from these two classes of business. In 1905, the revenue of all roads from mail service was \$45,426,125, and that from express was \$45,149,155. In 1915, the revenue of all roads from these two classes of service was \$58,359,095 and \$84,561,114, respectively. Taking both together, this is an increase from 15.8 per cent of all passenger train revenue to 17.9 per cent of all passenger train revenue. Revenue from express business, taken by itself, increased 87½ per cent. In 1915, the revenue from mail business of Class I roads only was \$56,959,261 and in 1917, \$58,775,765, an increase of only three per cent. Express business, however, increased from \$82,952,087 to \$123,673,777, or 49 per cent, and, from 10.6 per cent in 1915, had increased to 13.4 per cent of all passenger train revenue in 1917, while both sources of revenue constituted 19.8 per cent of all revenue in 1917.

Leaving out of consideration the first three years of the ten years prior to 1915, during the first two of which the number of passenger miles per passenger carrying car was light, and considering only those years for which passenger car mileage statistics are available, it will be found that the average number of passenger miles per passenger carrying car averaged about 950,000, which was equivalent to an average of about 61,500 miles per car per year with an average load of 15.4 passengers per car. To have handled the 45,600,000,000 passenger miles of passenger traffic in 1919 under these same conditions would have required a total of 48,000 passenger carrying cars, but there were only approximately 35,700 passenger carrying cars in service during that year, indicating a shortage of 12,300 cars.

But it is questionable whether passenger service should ever be restored completely to the competitive basis existing prior to 1915. It is generally conceded that more equipment was furnished than was needed economically to handle the business with a reasonable degree of comfort and convenience to the traveling public. On the other hand it is manifestly impracticable to attempt to continue to handle the present large volume of business without materially improving the accommodations furnished the traveling public. Since 1915 the number of passengers per car has increased from about 15 to almost 21. In view of the fact that this figure reflects the effect of the troop movement during the first half of the year, it will be highly conservative to assume that the service should be restored to the standards of 1917, when there were 17.6 passengers carried per car movement.

The steady maintenance of over 62,000 miles per passenger carrying car during the years 1910, 1911 and 1912, also indicates that it is practicable to maintain an average car mileage greater than 61,500 miles. It may also be considered as impracticable to maintain the high average of 1918 as this was partly affected by the troop movement during the latter half of the year, tending to raise the average above the amount practicably attainable with equipment in regular passenger service. Considering these facts it would seem reasonable to expect the maintenance of an average mileage per car throughout the country of 63,000 per year.

To have handled the 45,600,000,000 passengers carried one mile in 1919 on this basis would have required 41,080 cars, which is 5,480 cars more than were actually in service during the year.

If it be assumed that the service is to be restored to a normal basis within the next three years, there must be added to this figure the requirements to meet the normal increase of business which may be expected during that period. During the nine years from 1905 to 1914, which marked the maximum increase of business during the ten years prior to the outbreak of the European war, there was a total increase of 11,458,000,000 passenger miles, or 48 per

cent. There has been an increase since the close of the fiscal year 1915, a period of only four and one half years, of 43 per cent. This, of course, has been affected by a number of extraordinary conditions resulting from the European war, but it is reasonable to expect during the next ten years under normal conditions of development an increase at least as great as that which took place during the decade prior to 1915.

On this basis the total increase during the coming ten years will amount to 21,800,000,000 passenger miles, or an average of 2,180,000,000 annually. Assuming for the next three years an annual increase of an even 2,000,000,000 passenger miles, the railroads will be required to purchase 5,400 additional passenger carrying cars during the three-year period to maintain the standards of service and equipment mileage outlined above. It will, therefore, be necessary to purchase 10,880 passenger carrying cars during the next three years.

During 1918 the passenger carrying cars of the Class I railroads made up 66 per cent of the total number of passenger train cars in service. Assuming the continuance of this ratio, which, however, has been gradually decreasing, it will be necessary to purchase 5,620 new baggage, mail, express, dining and other passenger train cars in addition to the passenger carrying cars, which include coaches, combination passenger cars and sleeping and parlor cars of railroad ownership. Of this number about 4,800 will be baggage, mail and express cars.

But this total is based on the assumption that there are no cars in service at the present time which have been kept in service beyond the dates at which they should have been retired. During the ten years prior to 1915 there was an average retirement of 1,280 cars annually. During the last four years there has only been retired an average of 360 cars each year. It is evident, therefore, that there are 4,140 cars now in service which should be retired at the earliest opportunity and on the same basis 3,840 more cars should be retired during the next three years. Adding these 7,980 cars to the actual increase required, it is evident that there must be purchased during the next three years a total of about 24,500 passenger train cars, or an average of 8,160 cars a year, if passenger service is to be restored to something approaching the standards maintained during 1917.

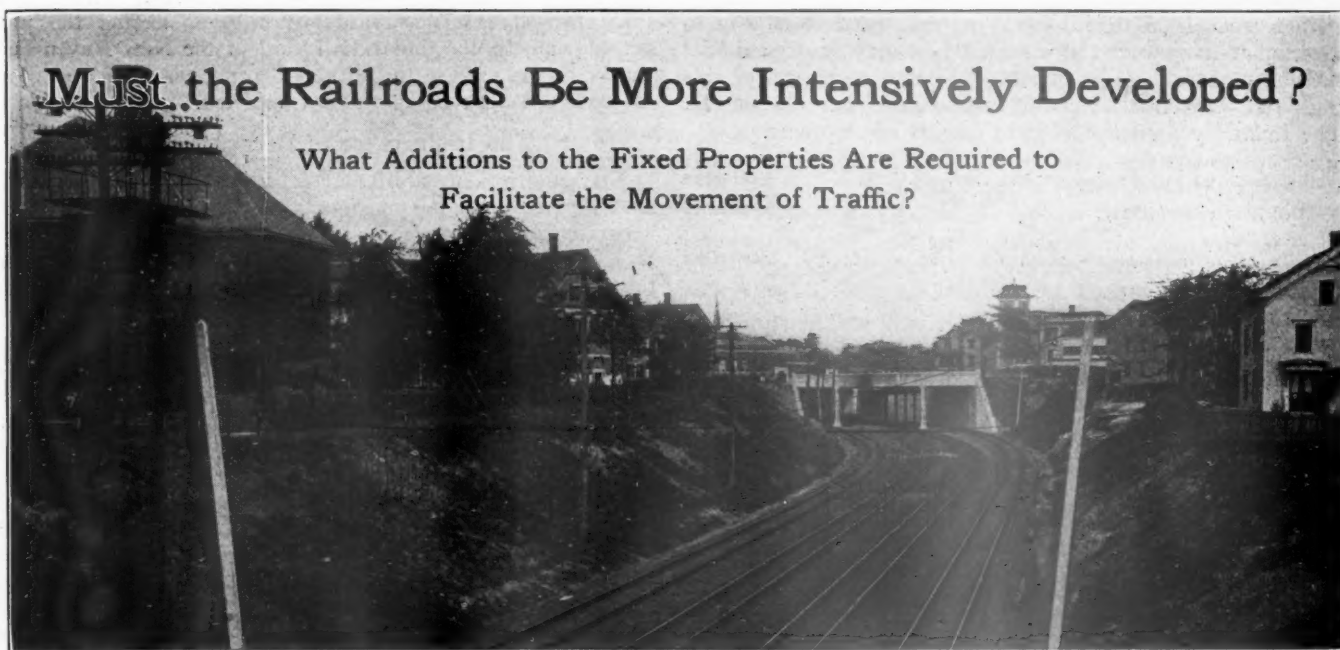
Since 1915 the prices of railway equipment have increased so rapidly that they undoubtedly have been one of the principal contributing factors in the small amount of equipment actually purchased. Such data as is available indicates that the increase which has taken place during the war period has been about 200 per cent or in other words that the equipment purchased now will cost approximately three times as much as the cost of similar equipment purchased in 1914. This ratio holds very closely true when applied to the prices for locomotives and freight cars paid by the Railroad Administration during 1918 and considering the increases in prices which have taken place since, it may be considered a conservative basis on which to estimate the capital required for the purchase of new equipment. Baggage, mail and express cars costing between \$6,000 and \$7,000 in 1914 will cost on an average of \$21,000 to \$22,000 at the present time, while steel coaches which cost \$8,500 in 1914 can probably not be built at the present time for less than \$25,000 to \$26,000. Applying these prices on a weighted average basis of the proportion of these two classes of equipment to the total, a conservative price for the 24,500 cars required during the next three years may be taken at \$24,000 each.

If the railroads are to restore and maintain passenger service to the standard of 1917, an expenditure, therefore, of \$588,000,000 will be required for new equipment during that time; this is an average expenditure of \$196,000,000 annually.



# Must the Railroads Be More Intensively Developed?

What Additions to the Fixed Properties Are Required to Facilitate the Movement of Traffic?



EVERYONE KNOWS that the railroad facilities are inadequate, but since James J. Hill's famous estimate of this inadequacy there have been few other attempts at concrete analyses. Superficial consideration would lead one to use past progress on improvement work as a measure of the present needs, and this would be legitimate if the increases in traffic were approximately uniform, but this has not been the case, and the intensive development of the railroads, namely, their ability to handle a traffic of increasing density is obviously a function of this growing traffic. Consequently any serious attempt to determine the present deficiency of railway facilities should start with a study of the growth of traffic and the increase in traffic density.

In 1911 the Class I roads of the United States, operating 216,878 miles of line, carried a revenue freight traffic of 249,843,166,302 ton miles, which represents an average freight traffic density on the roads of the country of over 1,161,164 ton miles per mile of line. This was handled with the aid of 23,266 miles of second track, 2,410 miles of third track and 1,747 miles of fourth or more tracks, or a total of 27,391 miles of supplemental main tracks, in addition to 84,499 miles of track in sidings and yards. Contrast these figures with those for 1918, when the Class I roads with 233,064 miles of line carried 400,379,284,206 tons of revenue freight one mile with an average traffic density of 1,717,894 ton miles per mile of line. This was handled with the aid of 35,565 miles of multiple main tracks and 103,061 miles of sidings and yard tracks. The question raised by a study of these figures is whether the increase in supplemental tracks during this period of seven years has kept pace with the enormous increase in the density of traffic.

This, however, is only one of the many problems to be considered in a study of the necessity of further intensive development of the railroads of the United States. It embraces not only the question of the adequacy of the mileage of tracks to accommodate moving and standing cars, the number and sizes of buildings necessary for the conduct of freight and passenger business, the repair of locomotives

and cars and the housing of employees, and the facilities required for the receiving, storage and delivery of water, coal and other supplies, but it also implies the introduction of improvements that will effect economies of operation as well as provision for non-productive investments, such as the larger passenger stations and grade separation work that must be provided in pursuance of public demands.

## Are There Enough Main and Side Tracks?

To return to the subject of adequate trackage and its relation to the density of traffic. From 1905 to 1914 the net ton miles per mile of line increased 32.2 per cent, while the mileage of multiple main tracks increased from 9.2 miles per 100 miles of line to 12.6 miles, or 37 per cent. During

the same period the mileage of sidings and yard tracks increased from 32.1 miles per 100 miles of line to 38.2 miles, or 19 per cent. Since June 30, 1914, the increase in traffic has taken place at a much more rapid rate, attaining practically the same percentage of increase in the 4½ years to December 31, 1918, as was effected in the preceding 10 years. The increase in the density of traffic was 32.1 per cent, but in this same period the increase in the proportion of supplementary main tracks to miles of line was only 7.8 per cent, and for sidings and yard tracks only 7.1 per cent. If we are to assume that the relation of the increase in

**D**URING the last few years the railroads have not been able to add to their facilities in proportion to the increased traffic. Analysis of requirements of fixed property shows the need of an expenditure of about \$2,500,000,000 in the next three years to make up deficiency and provide for the current annual improvements.

Additional tracks will require \$1,250,000,000, railway reconstruction \$600,000,000, engine houses and shops \$250,000,000, and station buildings, \$300,000,000.

auxiliary tracks to the increase in traffic density during the period from 1905 to 1914 was normal (and it is safe to assert that it was not above normal), it may be argued that the net increase in miles of multiple main tracks and of sidings and yard tracks should be the same in each period. The following figures shed light on this assumption:

Multiple main tracks built from 1905 to 1914 incl.....	14,038 miles
Multiple main tracks built from 1915 to 1918 incl.....	3,425 miles
Deficit at end of 1918.....	10,613 miles
Siding and yard tracks built from 1905 to 1914 incl.....	31,793 miles
Siding and yard tracks built from 1915 to 1918 incl.....	9,667 miles
Deficit at end of 1918.....	22,126 miles

A more conservative method of arriving at an estimate is to assume that the average annual increase in auxiliary track mileage during the 10-year period should be the normal increase for the succeeding years.

Average annual addition to multiple main tracks 1905 to 1914 incl. ....	1,404 miles
Average annual addition to multiple main track 1915 to 1918 incl. ....	761 miles
Average annual deficit to multiple main track 1915 to 1918 incl. ....	643 miles
Deficit at end of 1918 (4½ years).....	2,900 miles
Average annual addition to siding and yard tracks 1905 to 1914 incl. ....	3,179 miles
Average annual addition to siding and yard tracks 1915 to 1918 incl. ....	2,150 miles
Average annual deficit to siding and yard tracks 1915 to 1918 incl. ....	1,029 miles
Deficit at end of 1918 (4½ years).....	4,650 miles

The actual deficit in multiple track facilities at the end of 1918 lies somewhere between the maximum figure of 10,613 miles, arrived at from a comparison of traffic densities, and that of 2,900 miles, based on the construction record of the 10 years preceding 1914. It is evident that the demand for multiple tracks is not directly proportional to an increase in traffic. On the other hand, it is equally evident that the unusually rapid increase in traffic during the last few years makes necessary the construction of a greater mileage of second and third main tracks than was required in the 10-year period used for comparison. For want of a better assumption, the average of these two shortages will be considered to represent the actual deficit. This average is 6,800 miles.

To arrive at the shortage of present siding and yard tracks a somewhat different ratio must be used, since the necessity for these tracks bears a more direct relation to the amount of traffic handled. For this reason it has been assumed that three-quarters of the difference between the two figures should be added to the smaller to give the present shortage of these facilities. This gives 17,800 miles.

If these deficiencies are to be made up in the next three years we must add to these totals the deficiencies for 1919 (say 1,550 miles of main tracks and 4,000 miles of side tracks), plus the normal additions to main tracks and side tracks to be made during the three years 1920 to 1922, inclusive. We will then obtain as the total additional miles to be built in the next three years about 15,000 miles of multiple main tracks and 40,000 miles of additional side tracks and yard tracks.

Taking \$40,000 and \$18,000, respectively, as the present costs per mile, these additional mileages indicate a required expenditure of over \$1,250,000,000 for additional main tracks and yard and siding tracks. This estimated total may be compared with the amounts authorized for this purpose by the United States Railroad Administration. Over \$210,000,000 was appropriated for this purpose during 1918 and 1919, and nearly \$137,000,000 was actually expended.

It must also be borne in mind that these expenditures were for emergency purposes, under which only such projects were undertaken as could show quick results. This has been true especially of yard construction, which has consisted for

the most part of the elaboration of existing layouts. Two large projects for new yards in progress during the war period, namely, the Cedar Hill yard of the New Haven and the Markham yard of the Illinois Central near Chicago, were discontinued after being partly completed.

### The Importance of Reconstruction

The question of additional trackage has been discussed first because it is the most tangible, permitting of a more accurate measure of expression in actual figures. However, there are many other phases of the intensive development of the railways, which while not so readily demonstrated, are equally if not more important. Chief among these is the reconstruction of existing lines, primarily for grade and line improvement. It is impossible to make any accurate estimate of the probable amount of such work that could be done with profit. In many instances such work bears a close relation to the construction of double-track and may be done to obviate the construction of second tracks. As an instance under the old Stickney regime, traffic conditions on the Chicago Great Western line from Chicago to Dubuque were assumed to indicate the necessity for double tracking this line, and work was actually started on such a program, but as a consequence of reductions in grade and installations of automatic signals under the present management, it has been possible to handle a much heavier traffic on the single track line than that which was assumed to require immediate double-track construction. However, this is incidental to the real object of grade reduction, namely, greater economy of transportation, a principle that is too well known to require exposition here.

This subject bears an interesting relation to the work undertaken during the war period, particularly that authorized by the Railroad Administration during 1918. Under war conditions the elimination of congestion by increased capacity was the prime object and economy of operation alone was not considered sufficient justification for capital expenditures. As a consequence, practically the only grade reduction work prosecuted during the war was such as was well under way and could not readily be discontinued, or such as was incidental to the provision of additional tracks. For example, a certain amount of grade reduction work was carried on on the Big Four in connection with extensive second track work during the war, but the grade reduction was secondary; the real motive being to provide more trackage.

This calls attention to another reason why considerable grade reduction work, and with it, second-track construction should be undertaken in the near future. Under pressure to increase track capacity as quickly as possible, work has been undertaken, in general, at the most favorable locations, i. e., where the grading was the lightest. This afforded relief for congested single track, but the advantage of such work in increasing the tonnage ratings of locomotives will not be secured until the work is carried to completion for entire engine districts. As an instance, during 1918, a considerable mileage of second track work was done on the Hocking Valley between Columbus, Ohio, and Toledo, selecting those portions of the line where the least amount of work was involved in obtaining a 0.2 per cent grade line for northbound traffic. Among other gaps in the second track as the result of this plan is one between Columbus and Delaware which involves a pusher grade that cannot be eliminated without extensive change in location and while appreciable economies would result from the completion of this work, the nature of it was such as to lead to its postponement until a more favorable time. Considering the construction of additional main track and grade reduction together, extended projects like that carried on by the Chicago, Milwaukee and St. Paul in Iowa, Minnesota and South Dakota during 1912 and 1913 have been conspicuous



by their absence during the past five years. The notable exception to this rule was the improvement of the Southern Railway line from Washington to Atlanta, while in the west the nearest approach to this has been the Union Pacific double-track work in the Wahsatch mountains, in the territory just east of Green River, Wyo., and over Sherman hill. Other work started on the Union Pacific in 1918 in closing the gap in the double track between Evanston, Wyo., and Granger was discontinued on account of the war. This will unquestionably be resumed at the first favorable opportunity and is typical of much other work of a like nature remaining to be done, particularly in the west.

As pointed out in an article on the Rock Island System published in the *Railway Age Gazette* of May 19, 1916, that road is far in arrears in its double track program, and it is not alone in this. The national centralization of war work in the eastern states tended to concentrate the additions to railway facilities in that part of the country, and it is a notable fact that, with the exception of the Union Pacific improvements, very little grade reduction or additional track work has been done in the entire area west of the Mississippi River in the last five years.

That a great amount of work of this character remains to be done is indicated by the fact that one middle western road has recently completed surveys for a new double track line nearly 200 miles long which, while departing radically from the existing location, is primarily a low grade line designed to relieve the present congestion and promote economy of operation. It is impossible to prepare an accurate calculation of the amount of work of this character which should be done, but estimating, in view of past records, that the grades on one-half of one per cent of the mileage of the country should be reduced annually at a cost of \$70,000 per mile, the normal annual expenditures for this purpose would approximate \$100,000,000. Since only about \$5,000,000 has been expended for this purpose during the last two years, it may safely be assumed that not over 20 per cent of the normal appropriations have been made in the last four years. Consequently, the amount which should be expended to promote economical operation during the next three years, including both the normal appropriations for this period and the deficiencies which have accrued, would approximate \$600,000,000.

### Engine Terminals

Engine terminal facilities have been referred to at some length in the article covering the additions and betterments work of the Railroad Administration. The periodic reconstruction and enlargement of these necessary adjuncts to the operation of railways will always be required as long as traffic increases, locomotives grow larger and operating arrangements are subject to modification. On account of the rapid change in requirements, roundhouses have usually been temporary structures, although construction in the middle west and east during the war period has tended towards more permanent forms of buildings. The general tendency also is to provide more complete facilities. Heating, illumination, water, steam and air service and electric current for power and welding are being installed on a much more elaborate scale than heretofore. The object lesson offered by these modern installations will serve to demonstrate more than ever the inadequacy of some of the older installations, nearly all of which are decidedly lacking in modern facilities. The same argument holds for the outside appurtenances—water service, coal and sand facilities, cinder and inspection pits and yard illumination.

Some of the old terminals permit of extensive reconstruction but railway history goes to show that a considerable proportion of them are so cramped for space that the additional capacity and improved facilities can be obtained only by resorting to new sites. As a consequence, the amount of

new construction required is considerably larger than that indicated by the estimated increase in actual capacity necessitated by the circumstances. In other words, engine terminal construction is measured by the increase in engine housing capacity required plus that consequent to a high percentage of retirement. The same condition holds true in large measure of water and coaling service facilities. Increase in traffic is constantly resulting in the obsolescence of existing plants which calls for investments in entirely new facilities.

New shop buildings for the repair of locomotives like those recently completed on the Pennsylvania lines at several points in Ohio and Indiana, on the Union Pacific at Cheyenne, Wyo., on the Baltimore & Ohio at Glenwood, serve to demonstrate what a real shop should be. When it is considered that some of these new shops are equipped with 250-ton traveling cranes capable of hoisting and shifting the largest Mallet locomotives, while some roads are still conducting locomotive repairs in shops that have no overhead traveling cranes of any kind, it is readily understood that there is a large field for new shop construction.

As pointed out in the article on capital expenditures by the United States Railroad Administration, the additions and betterments to engine houses and shop facilities were made under the pressure of extreme necessity. The winter of 1917 and 1918 demonstrated the shortage of such facilities in a manner that was as conclusive as it was terrible. However, the endeavor to improve conditions cannot be said to have been entirely fulfilled. Like all other work done under war emergency, only the most serious cases were undertaken. Because traffic was concentrated in the east, these improvements were largely in the east and many railway officers have expressed the thought that the work accomplished thus far has but a beginning. Under the direction of the Railroad Administration \$130,000,000 was appropriated for shop buildings, engine houses, tools and power plants, but little over \$100,000,000 was actually expended. This is equivalent to an average of about \$50,000,000 a year. It is safe to assume that this amount does not exceed the average annual requirements. Consequently, the expenditures of the next three years would equal at least \$150,000,000 plus a deficiency of about \$100,000,000 more or a total of \$250,000,000.

### Little Passenger Station Work Now in Progress

One class of railway construction that has been virtually at a standstill for a long time is that of passenger stations. Only two stations of first magnitude are now being built, namely, the St. Paul (Minn.) union station and the union station at Chicago, and work on both of these structures has only been resumed since the signing of the armistice. The prohibition of work not essential to the conduct of the war was especially severe with structures of this class. Villages, towns and cities all over the country were definitely estopped from demanding improvements of this character, but now that the war is over and with the roads returned to the owners, there is again an insistent call for large expenditures for this purpose. With the approval of the Illinois Central lake front plan at Chicago by the United States War Department, another great project will be ready for actual prosecution. However, the great field for expenditures of this kind will come not from the isolated cases of monumental structures but from the great number of stations of all sizes and classes which will be called for by municipalities the country over. While the railroads will make every endeavor to restrict expenditures for this purpose in order to use the money for more productive improvements, experience has shown that they will be compelled to make generous appropriations along these lines. From a study of the situation, \$50,000,000 would seem to represent a conservative average annual requirement, so that normal

expenditures for the next three years plus a three-year deficiency would equal \$300,000,000.

In the course of the preceding discussion reference has been made from time to time to various projects that have been deferred for one reason or another, but which must eventually be undertaken as soon as the opportunity affords. Among others may be mentioned the New York Central's Castleton cut-off held up by the "dog-in-the-manager" policy of the people of Albany, N. Y., the Great Northern belt line around St. Paul also involving extensive yard rearrangement, the \$100,000,000 New York Central freight development on Manhattan Island and similar developments on the west side of the Hudson. Among projects of a less definite nature there are the proposed terminal unification at New Orleans, the freight and passenger terminals at Cleveland and Cincinnati, and plans for untangling the railway layout at East St. Louis, investigation of which is now under way. But important as these large projects are, the real field for the intensive development of the railroads lies in the smaller projects when considered in the aggregate. The extension of passing tracks, the enlargement of existing freight yards and the closing of gaps in double tracks, taken as a whole will sum up to large totals. The need of these additional facilities on all divisions of all railroads at the present time is as much responsible for the chronic car shortages as the actual deficiency in the number of cars.

## Report on Cost of Living Does Not Justify Wage Increase

EXECUTIVE OFFICERS of the railroad shop crafts affiliated with the Railroad Employees' Department of the American Federation of Labor called on Director General Hines on December 20, just before the Cummins bill was passed by the Senate, to discuss, according to a statement issued by the Railroad Administration, "the question of the cost of living," which is taken to mean that they renewed their request for a general increase in wages which has been held in abeyance since August, when the President and Mr. Hines asked them to wait a reasonable time to allow the government an opportunity to try to reduce the cost of living. The representatives of the shop employees at the time announced that they would consider 90 days a reasonable time. According to the official announcement, Mr. Hines explained that he hoped to be able in a few days to give more definite advice on this subject, and it was agreed that a further conference would be held a few days later.

On December 22 Attorney General Palmer issued a statement in the way of a report to the public on the results of the government's campaign against the high cost of living, in which he announced that since August it had been held in check, whereas statistics had usually shown a rise in prices during the fall months and that a drop may be expected between January 1 and March 1. The report, which was authorized by a committee of government officials that have taken part in the campaign, including Mr. Hines, is understood to form the basis of the government's answer to any further wage demands.

The demands of the shop employees were originally presented in January and were based on an increase for skilled mechanics from 68 to 85 cents an hour. Increases ranging from 4 to 9 cents an hour were granted them in August by way of readjustment at the time, it was announced the government could not then consider further increases to meet the cost of living, because they would tend to increase it still further. Most of the other organizations of railway employees also presented demands, which have also been held in abeyance. What position they will take in view of the report that the cost of living statistics do not justify

further increases has not yet been disclosed. It was stated on Tuesday that no definite date had yet been set for the conference with the shopmen, but B. M. Jewell, head of their committee, was quoted as saying they had no intention of striking. Mr. Palmer's statement was in part as follows:

"In August, in connection with the demands for increased wages by railroad shopmen, based on the increased cost of living, the President announced to the public the view that the cost of living would be lowered as soon as there were settled conditions of production and of commerce, as soon as the treaty of peace was ratified, and as soon as merchants, manufacturers, farmers and miners had a certain basis of circulations.

"In a statement to the shopmen themselves, the President declared that the primary step was to increase production and facilitate transportation, so as to make up for the destruction wrought by the war and the terrible scarcities created. The President added that the government had taken up with all possible vigor the task of bringing the profiteer to book, making the stocks of necessities in the country available at lower prices, stimulating production and facilitating distribution.

"The movement inaugurated at that time to gain control over the cost of living has been largely in the hands of the Department of Justice. It should be helpful to point out what has already been accomplished and what further steps are in contemplation.

"To assess the situation, it is necessary to look back and ascertain what the trend of prices has been in the past year.

"Taking retail food prices as a basis, the index numbers of the United States Bureau of Labor Statistics from 1911 to 1919 indicate that up to 1919 there has been a noticeable trend upward in such prices in the fall of the year, whereas, since August this year, such retail food prices have been kept practically stationary. By way of illustration, during the period, August to November, inclusive, 1916, there was an advance in retail food prices as indicated by the Bureau of Labor Statistics of 13 points; in 1917, 18 points; and in 1918, 16 points, as compared with no increase whatsoever in the corresponding period of 1919.

"Considering the four years from 1911 to 1914, inclusive, retail prices show a slight upward trend from September 1 to October 1, a greater upward trend from October 1 to November 1, and remained practically stationary from November 1 to December 1. During the four years from 1915 to 1918, inclusive, retail food prices show a decided upward trend from August 1 to September 1 and to October 1, and a slightly lessened but decided upward trend to November 1 and to December 1.

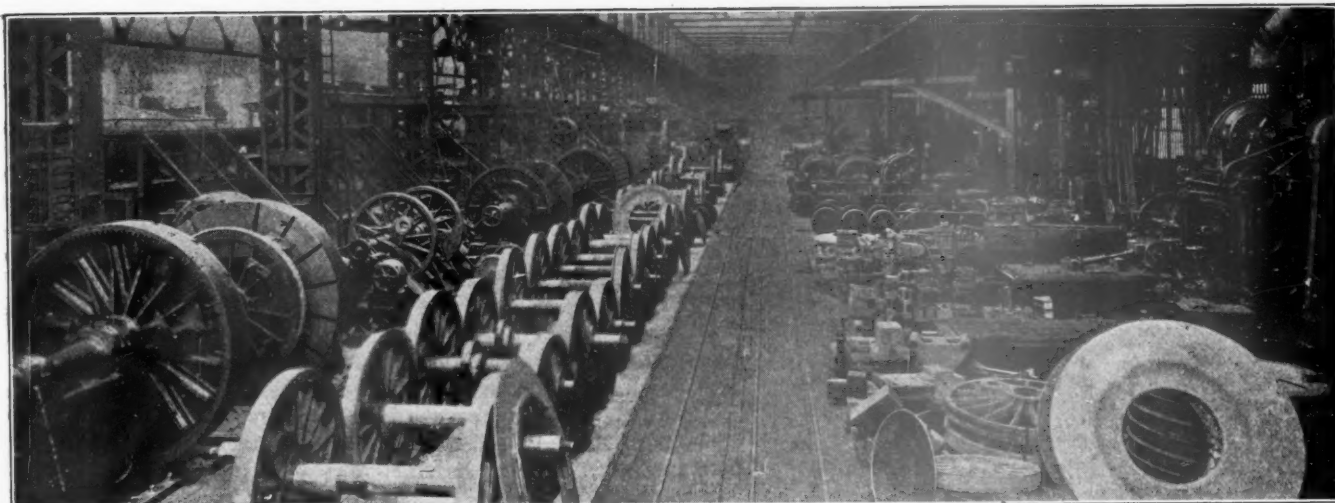
"This year, during September and October, an actual reduction in the general level of retail prices was effected as compared with August, while the figure for November, although slightly above that of October, shows no increase above the August returns.

"In other words, the official data clearly show the significant fact that the cost of living as indicated by retail prices was no greater in November of this year than it was in August, while during former years, extending back to 1911, the returns for November show a considerable increase over the August returns.

"The history of retail food prices indicates that a decided downward trend ordinarily may be expected in the part of the year between January 1 and March 1, and it is to be hoped that this trend will be accelerated this year by the campaign initiated by the government, which is just now getting well under way.

"The Department of Justice has instituted a thoroughgoing and nation-wide campaign, participated in by thousands of men and women, bringing about regulations in the cost of living through education and through moral suasion."





*Lots of Work for the Machines*

## Shop and Enginehouse Equipment and Facilities

Over \$146,000,000 Should Be Spent for Improved Shop Machinery and Equipment in the Next Three Years

**R**ECORDS OF THE RAILROAD ADMINISTRATION show that during the past year 26 per cent of the motive power of the country was held out of service waiting for necessary repairs. This large proportion of unavailable power in 1919 was six per cent greater than that held out of service for the same reason during 1918. The future growth of American industry is absolutely dependent upon adequate transportation, which in turn can be assured only by repair shop facilities sufficient to keep motive power and rolling stock in serviceable condition.

It will undoubtedly be necessary to buy many new locomotives and cars to make up present deficiencies, but it is useless to purchase new equipment without providing the shops and shop facilities required to keep it in repair. Frank McManamy has said that "\$10,000,000 expended on shop machinery and equipment before the war would have made government control unnecessary." This is probably an exaggeration, but the freight embargoes and general tie-up of business during the later part of 1917 undoubtedly were due in no small measure to the fact that necessary cars and locomotives were unserviceable. This condition was particularly true in the Eastern district where the congestion presented a most serious problem.

While it is true that the roads are not now confronted with the necessity of transporting immense quantities of war material, the difficulties of the present situation are accentuated by the rapid expansion of business since the signing of the armistice. During the war many of the normal demands and activities of the public had to go unsatisfied, but with the resumption of ordinary business after the war and

with inadequate transportation facilities, the situation now confronting the railways is serious and will be increasingly so, especially if the country continues to produce large crops. The only solution is to provide new equipment and arrange for its proper repair, and do it now.

In attempting to make an estimate as to the amount that railway repair shops are behind in their shop and engine-

house equipment, it will be necessary to know how much has been spent for this purpose in the past few years. The shop machinery charge and the ratio of shop machinery to total operating expense for Class I carriers have been plotted over a period of years, beginning with June 30, 1911, as shown on the chart. The statistics upon which the chart is based were compiled by the Interstate Commerce Commission and are not available before June 30, 1911, because previous to that time there had been no subdivision of the maintenance of equipment account into shop machinery and other component parts.

The operating expense account covering shop machinery (Account 302) includes the cost of labor and material necessary to maintain machinery and tools located in loco-

motive shops, car shops, engine houses, foundries or shops of the buildings and bridges department. The charge includes the cost of repairing and replacing broken or worn-out machines, but new and improved labor-saving machines are charged against capital account. Electric power plant machinery when employed exclusively for operating shop machinery is included in Account 302, but machinery for general purposes, such as heating, lighting, fire protection and water supply are not included.

**T**HE STATEMENT of Frank McManamy that "Ten million dollars expended on shop machinery and equipment before the war would have made government control unnecessary" indicates plainly a weak link in our transportation chain.

Past deficiencies in shop equipment must be made up, equipment must be provided to maintain the existing plant, and to anticipate future needs.

\$146,158,000 is a conservative estimate of what must be spent in the next three years for this purpose.

Table I shows the data on which the chart is based. The total operating expenses and shop machinery charge for 1919 are estimated from statistics for the first 10 months of the year. As a means of determining the ratio of shop machinery to total operating expenses in 1918, the statistics

TABLE I—STATISTICS FOR CLASS I CARRIERS

For fiscal year ending	Total operating expenses	Account 302 shop machinery	Per cent of total expenses
June 30, 1911.....	\$1,844,065,958	\$10,061,423	.546
June 30, 1912.....	1,898,662,465	10,417,543	.548
June 30, 1913.....	2,108,947,614	12,182,668	.578
June 30, 1914.....	2,139,755,988	11,674,904	.546
June 30, 1915.....	2,021,160,614	8,916,891	.441
June 30, 1916.....	2,210,892,786	10,295,918	.466
December 31, 1916.....	2,357,398,412	11,517,657	.489
December 31, 1917.....	2,829,325,123	14,552,997	.514
December 31, 1918.....	3,948,132,200	27,520,000	.696
December 31, 1919.....	4,335,000,000*	30,250,000	.698

\*Estimate based on statistics for the first ten months of 1919.

of six representative roads were obtained and are listed in Table II. The total of \$6,670,649 spent on shop machinery annually by only six roads gives some idea of the immense market for tools and equipment afforded by American railways. Attention is called to the relatively high percentage which the shop machinery charge bears to the total operating expenses. This was caused by the large increases

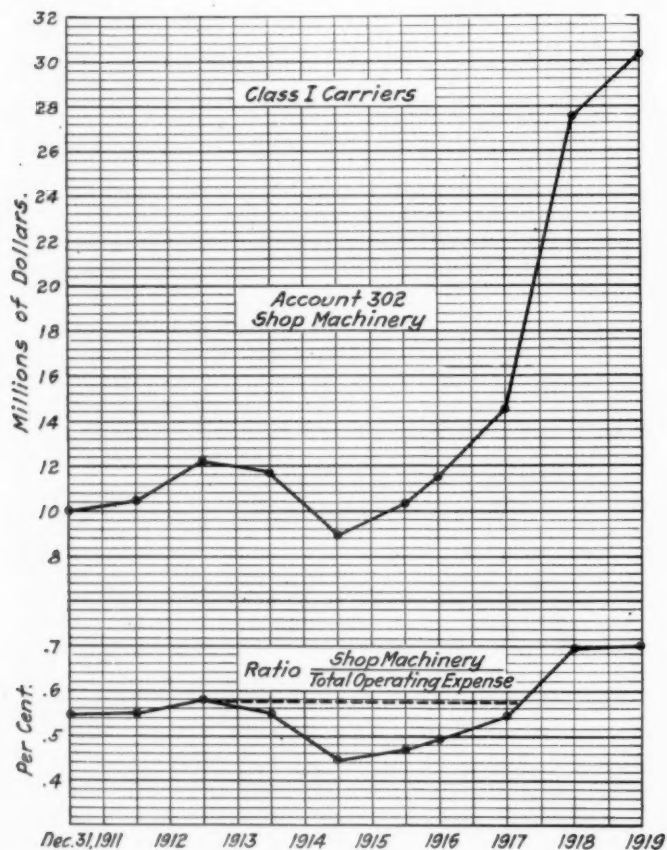


Chart Showing Shop Machinery Expenditures and Ratio of Shop Machinery Expense to Total Operating Expense, Class I Roads, From 1911 to 1919, Inclusive

in labor and material costs during 1918. Based on the relative totals, the ratio of shop machinery to the total operating expenses for 1918 would be .730 per cent, but to be conservative .696 per cent (the average of the individual ratios) is used.

Reference to the chart shows that in the fiscal year ending June 30, 1911, \$10,661,423 was spent for shop equipment and to repair and replace worn-out shop machinery. There was an increase to \$12,182,668 in the following two years,

but for the succeeding four years the shop machinery charge was below normal. It was not only small, but a relatively small proportion of the total operating expense. This failure to keep repair shop facilities up to the necessary standard was due, as previously stated, to the difficulty of securing capital, scarcity of labor and the high prices and scarcity of materials. With the beginning of government control in 1918 capital was available, and the priority given to government orders made possible the purchase of railway equipment. Consequently the shop machinery charge practically doubled during the year 1918, as indicated on the chart. This does not mean, however, that twice as much machinery and equipment was repaired and replaced in 1918 as in former years. The fact is that twice as much money was paid for the usual amount of equipment. A canvass of machine tool builders and other manufacturers indicates that 100 per cent is a conservative estimate of the increase in cost of machine tools and shop supplies since 1916.

Referring to the chart, the ratio of shop machinery to total operating expense in 1911 was .546 per cent. This ratio increased to .578 per cent in 1913 and then, due to causes before stated, dropped below normal for the succeeding four and a half years. During 1918 and 1919 the ratio increased to .696 and .698 per cent, respectively.

There is no question that railroad shop facilities were inadequate even in 1913, and it is probable that in order for them to have increased in proportion with business demands the ratio of shop machinery to the total operating expenses should have increased uniformly from June 30, 1913, to December 31, 1918. If, however, the ratio is considered constant at .578 per cent during this period, as indicated by the dotted line, a conservative estimate of the deficiency in shop machinery during this period will be obtained. The difference between .578 and the actual ratio for any one year multiplied by the total operating expense for the corresponding year will give the difference between the amount of money that should have been spent on shop machinery for that year and the amount that was actually spent. These amounts have been calculated, and their sums

TABLE II—1918 STATISTICS OF SIX REPRESENTATIVE ROADS

Name of road	Total operating expenses	Account 302 shop machinery	Per cent of total expenses
Atchison, Topeka & Santa Fe....	\$144,912,375	\$884,374	.610
Chicago, Burlington & Quincy..	112,067,616	997,507	.890
Southern Pacific .....	113,652,897	738,237	.650
Chicago, Milwaukee & St. Paul.	122,196,105	531,558	.434
Pennsylvania (Lines East).....	333,624,523	2,886,760	.865
Pennsylvania (Lines West).....	86,550,256	632,213	.729
Total .....	\$913,003,772	\$6,670,649	4.178
		Average per cent	.696

are shown in Estimate (a) as \$9,835,000. However, the statistics given in Table I, and shown graphically in the chart apply to Class I roads only. The operating expenses of Class I roads are about 96 per cent of the total operating expenses of all carriers, and 4 per cent has been added to \$9,835,000, making a total of \$10,229,000. But this equipment and machinery should have been bought previous to 1917, and it will now cost 100 per cent more to replace it, which brings the deficiency up to \$20,458,000.

During the years 1918 and 1919 the amount of money spent for shop machinery was greater than the average, but the machinery and equipment actually acquired was probably less than normal, due to the depreciated value of the dollar. The amount of money spent during the same period for additions and betterments to take care of increased business was wholly insufficient. The replacement value of railway shop machinery in the United States is \$292,200,000. Inasmuch as the annual increase in equipment has been not less than 3.70 per cent and it will require at least 4.2 per cent increase in shop facilities to handle this equipment, the necessary additions and betterments may be expressed



as  $.042 \times 292,200,000 = \$24,450,000$ . The total deficiency in shop machinery and equipment up to the present time, therefore is shown in Estimate (a) as \$44,908,000.

### Maintenance of Shop Machinery

Having determined the deficiency in shop machinery and facilities to date, it is necessary to estimate what repairs and replacements will be necessary in the next three years to maintain the existing plant. Referring to the chart, it will be noticed that in 1919 a total of \$30,250,000 was spent on shop machinery. It is probable that this charge will continue to increase in the next three years, due to increasing labor and material costs, but to be conservative it has been considered constant at \$30,250,000. Part of this charge goes to labor and should be separated from the strictly material charge. Data extending over a four-year period show that only 67 per cent of the shop machinery charge represents material, the balance representing the labor required to repair and replace the worn equipment. Consequently, as shown in Estimate (b), there is \$20,280,000 worth of material in the annual shop machinery charge. This must be increased by 4 per cent to include all roads; and in a period of three years the total estimated amount of material to be bought will cost \$64,470,000.

That this figure is not excessive may be shown by a consideration of reasonable depreciation charges for the three-year period. It is true that some shop machinery has been used for 20 years or more, but with the continual modern changes and improvements it is doubtful if any machine will have a useful and efficient life greater than 15 years. This means an annual depreciation of 6.67 per cent, which for three years on an investment of \$292,200,000 is \$58,500,000. In other words, the estimate of \$64,470,000 for shop facilities would hardly do more than cover shop machinery depreciation.

### Additions and Betterments

Additions and betterments, being chargeable to capital account, provide the necessary equipment to care for increased business. In order to estimate future needs, it is necessary to examine past expenditures for this account. In the 30 months from June 30, 1914, to December 31, 1916, only \$6,063,719 was spent for shop machinery additions and betterments. During the following year \$6,000,000, and in the first year of government control \$7,698,596 were spent for machine additions and betterments, but that this amount was entirely inadequate for the needs is indicated by the fact that only 35.2 per cent of the authorized additions and betterments were actually made.

In estimating what must be done in the next three years in the way of additions and betterments to shop machinery, it is believed that the most accurate result will be obtained by determining the total value of railway shop machinery in the United States and assuming that this plant must be increased in the same proportion as the increase in equipment made necessary by new business. In the years 1905 to 1915 there was an increase in locomotives of 3.76 per cent and cars 3.70 per cent; but this takes into account only the numbers of cars and locomotives and does not consider their increased weight. Heavier machinery and tools will be required to repair this equipment, and if the equipment increase is assumed at 3.7 per cent per annum the machinery increase must be at least 4.2 per cent.

According to estimates made in 1916, the total value of railway shop machinery in the United States amounted to \$146,100,000. Referring to Estimate (c), the replacement value of this machinery in 1919 would be at least \$292,200,000. Assuming then that the plant must be increased 4.2 per cent per annum to care for the new equipment, the total investment in the next three years must be \$36,780,000.

### Conclusions

The total amount of money that should be spent during the next three years for shop equipment and machinery, as shown in Estimate (d), is \$146,158,000. This amount is probably less than the actual needs, because every assumption in the calculation was made on the safe side. The

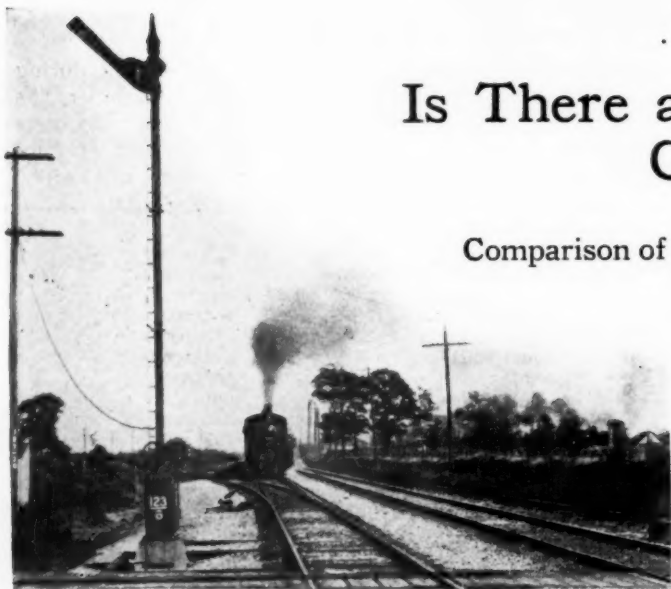
ESTIMATE			
(a) Deficiency in shop machinery:			
From June 30, 1913 to December 31, 1917—			
.578 — .546 = .032 ×	\$2,139,755,988 =	\$685,000	
.578 — .441 = .137 ×	2,021,160,614 =	2,770,000	
.578 — .466 = .112 ×	2,210,892,786 =	2,475,000	
.578 — .489 = .089 ×	2,357,398,412 =	2,095,000	
.578 — .514 = .064 ×	2,829,325,123 =	1,810,000	
		\$9,835,000	
Adding four per cent to include all roads		394,000	
Deficiency in shop machinery December 31, 1917 .....		\$10,229,000	
Cost of replacing in 1919.....		\$20,458,000	
Deficiency in additions and betterments to December, 1919.....		24,450,000	
Total .....		\$44,908,000	\$44,908,000
(b) Maintenance of shop machinery (for three years 1920-1922):			
Annual shop machinery charge.....		\$30,250,000	
But only 67 per cent is material.....		20,280,000	
Adding four per cent to include all roads .....		1,210,000	
Total material to be purchased annually .....		\$21,490,000	
For three years.....		3	
Total .....		\$64,470,000	\$64,470,000
(c) Additions and betterments (for three years 1920-1922):			
Value of shop machinery in 1916.....		\$146,100,000	
Replacement value in 1920.....		292,200,000	
Annual equipment increase of 3.7 per cent will require 4.2 per cent investment in machinery.....		12,260,000	
For three years.....		3	
Total .....		\$36,780,000	\$36,780,000
(d) Grand total (a) + (b) + (c).....			\$146,158,000

magnitude of the result gives some indication of how serious the situation has become. The cost of all materials has practically doubled in the past three years, shop employees' hours have been reduced to eight hours and wages have increased on the average at least 100 per cent. To offset these increased costs and place back into service the locomotives now held waiting repairs, it will be necessary to make up previous deficiencies in equipment and modernize all shops.

Automatic and semi-automatic machinery, for example, should be more generally used in back shops where material is manufactured for the whole system.

Another field that deserves particular attention is the enginehouse machine shop. It would be hard to determine how many locomotives are held out of service and sent to the back shop for light repairs because of inadequate enginehouse equipment.

The material and equipment purchased for railway shops and included in this discussion is of almost infinite variety from belts, air hose, rope and packing to boilers, cranes, welding equipment, lathes, etc. The largest single item is machinery and tools. Approximately 38 per cent of the total material costs are for machinery, which means that during the next three years \$54,100,000 should be spent for railway shop machinery and machine tools.



# Is There a Deficiency in Signal Construction?

Comparison of Conditions for Past Four Years with Ten Years  
Previous Indicates a Shortage

**T**HE BLOCK SIGNAL mileage (manual and automatic) in operation on the railroads of the United States increased from 44,574.7 miles of road on January 1, 1905, to 96,279.1 on December 31, 1914, or 51,704.4 miles, an average increase of 5,170.4 miles a year, while the total miles of road on which passenger trains operated increased from 151,455 to 193,180, or 41,725 miles between 1907 and 1914, inclusive, an average yearly increase of 5,216 miles. During this period the *automatic* block signal mileage increased from 5,116.3 to 29,600, or a total of 24,483.7, while the manual block system increased from 39,560.5 miles to 66,679.1, or a total of 27,118.6 miles. The number of revenue tons carried one mile per mile of road by all roads increased from 861,396 in 1905 to a maximum of 1,245,158 in 1913.

In contrast with these figures, the block signal mileage increased from 96,279.1 on January 1, 1914, to 99,350.8 in four years. During this time the total miles of road on which passenger trains operated decreased from 193,180 miles to 191,133, or 2,047 miles, as indicated in the Interstate Commerce Commission's tabulation of statistics pertaining to block signals, while the automatic block signal mileage increased from 29,600 to 36,593, or 6,993.7, and the manual block mileage decreased from 66,679.1 miles to 62,756.9, a drop of 3,922.2 miles. During this period, which covers that of the war and of government control, it is interesting to note that the number of revenue tons carried one mile per mile of road on Class I roads increased from 1,176,923 to 1,717,894, or 540,971 tons.

From a study of the above figures the question may be raised as to whether the block signal mileage has kept pace with the enormous increase in the amount of traffic handled by the railroads during the last four years. This is only one of many different questions confronting railway managements in connection with the future intensive development

of their systems, but, because of the importance of block signals in facilitating the movement of traffic, in addition to increasing the safety of operation, it is one that should receive more careful consideration than has been given it in the past. In order to determine the deficiencies existing in this particular branch of railroad service, it will be well to consider the broad term "signaling" under its various sub-heads, such as automatic block, manual block and interlocking.

## Have Automatic Block Installations Dropped Off?

During the 10-year period from January 1, 1905, to December 31, 1914, inclusive, marked progress was made in the installation of automatic block signals, the mileage of road equipped per year varying from a minimum of 1,387.6 in 1908 to a maximum of 4,350.5 miles during 1913. The total automatic block signal mileage installed during the 10 years was 24,483.7, or an average of 2,448.4 miles a year. In this connection it is interesting to note that of the total mileage of passenger lines operated, 7.1 per cent was protected by automatic block signals at the end of 1907, while at the end of 1914 this percentage had risen to 15.3.

Assuming the progress for the 10 years preceding 1915 as normal and comparing it with that for the four years from January 1, 1915, to December 31, 1918, inclusive, as obtained from the records of the Interstate Commerce Commission, we find that the progress in the late years has not been satisfactory. The mileage of road equipped with automatic block signals ranged from a minimum of 1,113.1 miles in 1915 to a maximum of 2,242.2 miles in 1917, the total for the four years being 6,993.7 miles, or only 2,643.2 miles more than was placed in service in 1913 alone. The average mileage installed was 1,748.4 per year, or but 360.8 miles more than was

installed during the year of the panic in 1908, the lowest in the preceding 10 years, despite the fact that during this latter period the revenue tonnage handled was greatly in excess of that during the 10 years preceding.

From the above figures the net average annual deficiency in the construction of automatic signal mileage may be assumed to be at least the difference between 2,448.4 miles (the average for the 10-year period preceding 1915) and 1,748.4 or 700 miles, a deficit of 28.5 per cent. Therefore, in order to bring the automatic signal mileage up to that which would have existed if the normal rate of construction of the 10-year period had been maintained, without taking

**A** DEFICIENCY of 3,500 miles in automatic block signal construction has occurred during the past five years. The next three years should see 10,850 miles of automatic block signals installed to bring facilities back to normal.

Manual block signal mileage reached a maximum in 1914, then began to decline.

261 interlocking plants should be installed during the next three years.

\$52,764,000 should be spent on signal work in this period.



into consideration the extraordinarily large increase in revenue tonnage which has occurred within the last five years, it would be necessary to make up a deficit of 2,800 miles which accrued from January 1, 1915, to January 1, 1919. From January 1, 1919, to January 1, 1920, the statistics published elsewhere in this issue indicate that a further deficit of 700 miles has also been created. Therefore the total deficit for the last five years is 3,500 miles. In order to bring the facilities up to where they would be if the normal rate of development were maintained, it would be necessary during the next three years not only to build the normal mileage of 2,448.4 miles per year, but also to make up the deficit of 3,500 miles. This would require the construction in the next three years of 10,847.2 miles. This is equivalent to 3,615.7 miles each year during this period.

Of the total mileage of passenger lines operated on the roads reporting block signals, 15.3 per cent was protected by automatic block in 1915 as compared with 19.1 per cent at the end of 1918. The commission's figures show that the total mileage of passenger lines operated on the road, shown in its tables, decreased from 193,180 miles of road in 1914 to 189,810 in 1916, but increased to 191,133 in 1918. This variation may be due to a number of causes, such as the abandonment of certain lines for passenger service or the discontinuance of operation on certain lines.

The deficiency in signal facilities may be considered from still another angle. A study of the Commission's reports for a period of five years indicates that increases in automatic block signal mileage occurred each year, on an average, on 23 systems. For the 10-year period this would indicate an installation of 106.5 miles per system, while for the last four-year period this has dropped to 76 miles for each

however, there was a net decrease of 517.6 miles in 1908 and another of 1,563.4 miles in 1914. The decrease in 1908 was due largely to the temporary closing of a large number of telegraph offices, while the larger decrease noted in 1914 occurred when the largest mileage of automatic block signaling which has been installed in any one year to date was placed in service, this mileage being 4,350.5, the decrease in the manual block in this year being very largely due to its replacement by the automatic block. During this 10-year period the mileage protected by manual block reached its maximum of 66,679.1 miles in 1914, during which year the total mileage of passenger lines operated also reached a maximum of 193,180 miles. A study of the percentages of passenger mileage operated and protected by non-automatic block during this period discloses the interesting fact that it ranged between 29.3 in 1908 and 34.5 in 1914, a total variation of 5.2 per cent, or an increase of 17.7 per cent, as compared with a variation of automatic block signals of from 7.1 per cent in 1907 to 15.3 per cent in 1914, an increase of 115.5 per cent.

### Manual Block Signaling

During the four years from January 1, 1915, to December 31, 1918, inclusive, the total manual block signal mileage decreased from a maximum of 66,679.1 miles in 1914 to 62,756.9 miles in 1918, or 3,922.2 miles. The percentage of the passenger lines protected by this system dropped from 34.5 per cent in 1914 to 32.8 in 1918, as compared with an increase in the percentage protected by automatic block signals for the same period from 15.3 to 19.1 per cent. This decrease in the use of the manual block was evidently due to the replacing of the manual system by automatic

TABULATED DATA SHOWING STATISTICS PERTAINING TO BLOCK SIGNALING IN THE UNITED STATES

From—	To—	Manual block mileage installed	Automatic block mileage installed	Total mileage for year (net increase)	Total manual block mileage to date	Total automatic block mileage to date	Total block signal mileage to date	Total mileage (of road) passen- ger lines operated	Per cent pro- tected by non- auto. block.	Per cent pro- tected by auto block signals	Total per cent protected	Total per cent unprotected	No. systems reporting signal work
Jan. 1, 1905.....	Sept. 30, 1906...	2,355.8	1,710.6	4,066.4	41,916.3	6,826.9	48,743.2	151,455	31.6	7.1	38.7	61.3	84
Sept. 30, 1906.....	Jan. 1, 1908.....	5,959.4	3,976.1	9,935.5	47,875.7	10,803.0	58,678.7	161,451	29.3	7.6	36.9	63.1	98
Jan. 1, 1908.....	Jan. 1, 1909.....	517.6*	1,387.6	870.0	47,358.1	12,190.6	59,548.7	162,526	31.7	8.8	40.5	59.5	102
Jan. 1, 1909.....	Jan. 1, 1910.....	4,162.2	2,047.1	6,209.3	51,520.3	14,237.7	65,758.0	172,390	31.1	10.3	41.4	58.6	107
Jan. 1, 1910.....	Jan. 1, 1911.....	2,037.3	3,473.8	5,511.1	53,557.6	17,711.5	71,269.1	176,845	31.7	11.5	43.2	56.8	114
Jan. 1, 1911.....	Jan. 1, 1912.....	2,517.2	2,623.4	5,140.6	56,074.8	20,334.9	76,409.7	183,461	33.6	12.1	45.7	54.3	119
Jan. 1, 1912.....	Jan. 1, 1913.....	5,656.2	1,883.9	7,540.1	61,731.0	22,218.8	83,949.8	185,986	32.3	14.3	46.6	53.4	127
Jan. 1, 1913.....	Jan. 1, 1914.....	1,563.4*	4,350.5	2,787.1	60,167.6	26,569.3	86,736.9	193,180	34.5	15.3	49.8	50.2	150
Jan. 1, 1914.....	Jan. 1, 1915.....	6,511.5	3,030.7	9,542.2	66,679.1	29,600.0	96,279.1	190,812	34.4	16.2	50.6	49.4	152
Jan. 1, 1915.....	Jan. 1, 1916.....	1,112.0*	1,113.1	1.1	65,567.1	30,713.1	96,280.2	189,810	34.4	17.2	51.6	48.4	156
Jan. 1, 1916.....	Jan. 1, 1917.....	196.9*	1,843.5	1,646.6	65,370.2	32,556.6	97,926.8	191,634	33.5	18.3	51.8	48.2	166
Jan. 1, 1917.....	Jan. 1, 1918.....	1,214.9*	2,242.2	1,027.3	64,155.3	34,798.8	98,954.1	191,133	32.8	19.1	51.9	48.1	157
Jan. 1, 1918.....	Jan. 1, 1919.....	1,398.4*	1,794.9	396.5	62,756.9	36,593.7	99,350.6	191,133	32.8	19.1	51.9	48.1	157
<b>TOTALS</b>													
Jan. 1, 1905.....	Jan. 1, 1915.....	27,118.6	24,483.7	51,602.3	486,880.5	160,492.7	647,373.2	1,387,294	...	...	...	...	...
Yearly average.....	Jan. 1, 1915.....	2,711.9	2,448.4	5,160.2	48,688.0	16,049.3	64,737.3	173,412	...	...	...	...	...
Jan. 1, 1915.....	Jan. 1, 1919.....	3,922.2*	6,993.7	3,071.4	257,849.5	134,662.2	392,511.7	763,389	...	...	...	...	...
Yearly average.....	Jan. 1, 1919.....	980.5*	1,748.4	767.9	64,462.4	33,665.5	98,127.9	190,847	...	...	...	...	...

\*Decreases.

company. A careful survey of the present needs of individual roads has been made, based upon information furnished by those in close contact with the conditions on the respective lines and taking into account the increased tonnage, as a result of which the conclusion is that an average of 175 miles of automatic signaling should be installed during each of the next three years by each road making such installations in order to bring this type of signal construction back to a normal basis and to provide for the increased traffic. Assuming that the number of roads making such installations is 23, as before, this would indicate that the average mileage which should be installed each year would be 4,025.

From January 1, 1905, to December 31, 1914, inclusive, manual block signaling increased from a total mileage of 39,560.5 to 66,679.1, or 27,118.6 miles. During this period,

block and to a decrease of 2,047 miles in the passenger mileage reported in the tables. As long as this passenger line mileage remains nearly stationary, the mileage protected by the manual block will likely continue to decrease in very nearly direct proportion to the increase of the automatic block signal mileage.

An increase in this type of protection may again take place when the passenger line mileage operated begins to increase materially, as the manual block may then be installed on stretches where the traffic density does not warrant the construction of automatic signals. For this reason the installation of this system will not be considered in connection with the present study of signaling required to bring the construction back to normal.

In studying the conditions affecting the construction of interlocking plants, one is handicapped by the lack of proper

statistical data. The Interstate Commerce Commission did, however, attempt to tabulate certain information of this nature in its annual signal statistics for the years 1913 to 1916, inclusive. An analysis of the data for the years 1914 and 1915 shows that of the total number of plants of all kinds 79 per cent were mechanical; 4.6 were electro-mechanical; five-tenths of 1 per cent were pneumatic; 3.9 per cent were electro-pneumatic and 12 per cent were electric. The average number of working levers per plant was 23.6.

### Interlocking

The Commission's report for the year ending December 31, 1915, shows an increase of 2,904 working levers over those in service the previous year. Inasmuch as many of these levers were reported by more than one carrier, it is necessary to make an arbitrary estimate of the total number of new levers actually installed. Assuming that three-fourths of the 2,904 levers were reported twice, the total new levers actually installed would be 1,815, distributed as follows: 1,433 mechanical, 84 electro-mechanical, 9 pneumatic, 71 electro-pneumatic and 218 electric. During the same year statistics collected by the *Railway Age* showed a total of 2,595 levers installed, as compared with 2,904 given in the Commission's report, which would indicate that approximately 10 per cent of the new work was not reported to the *Railway Age*.

With the above as a basis, the statistics compiled by the *Railway Age* for the years 1916 to 1918, inclusive, show the following:

Year	Total number levers	Total plus 10 per cent	Total levers deducting duplications	Total mechanical levers 79 per cent	Total electro-mechanical 4.6 per cent	Total pneumatic obsolete	Total electro-pneumatic 4.4 per cent	Total electric 12 per cent	Equivalent number of plants
1916	2,135	2,349	1,468	1,161	67	...	64	176	62
1917	3,628	3,991	2,495	1,971	115	...	110	299	106
1918	3,172	3,448	2,180	1,722	101	...	96	261	92
Totals	8,935	9,788	6,143	4,854	283	...	260	736	260
Ave.	2,978	3,263	2,048	1,618	94	...	87	245	87

The Interstate Commerce Commission's statistics for the year ending December 31, 1916, show a total of 6,101 crossings of Class I and II railways with other steam railways and 2,543 with electric-interurban or street railways protected by gates, flagmen, interlocking devices, etc., while 4,371 crossings with other steam railways and 2,209 with electric-interurban or street railways remained unprotected. The available information from this source is as follows:

	Protected		Unprotected	
	Other steam railways	Electric interurban street rys.	Other steam railways	Electric interurban street rys.
June 30, 1915.....	5,903	2,491	4,164	2,215
June 30, 1916.....	6,030	2,497	4,220	2,210
December 31, 1916.....	6,101	2,543	4,371	2,209
Totals .....	18,034	7,531	12,755	6,634
Total increase .....	198	52	207	-6
Increase per year.....	132	34	138	-4

From the above table it would appear that unprotected steam road crossings increased slightly faster than those protected. The table does not include returns for switching and terminal companies, and as it represents the aggregate of figures compiled from the annual reports of Class I and Class II carriers, duplication exists with respect to crossings with "other steam railways," as each such crossing involves two railways; but since Class III carriers and switching and terminal companies are not covered by the compilation the extent of the duplication is obviously less than one-half of the number of such crossings shown.

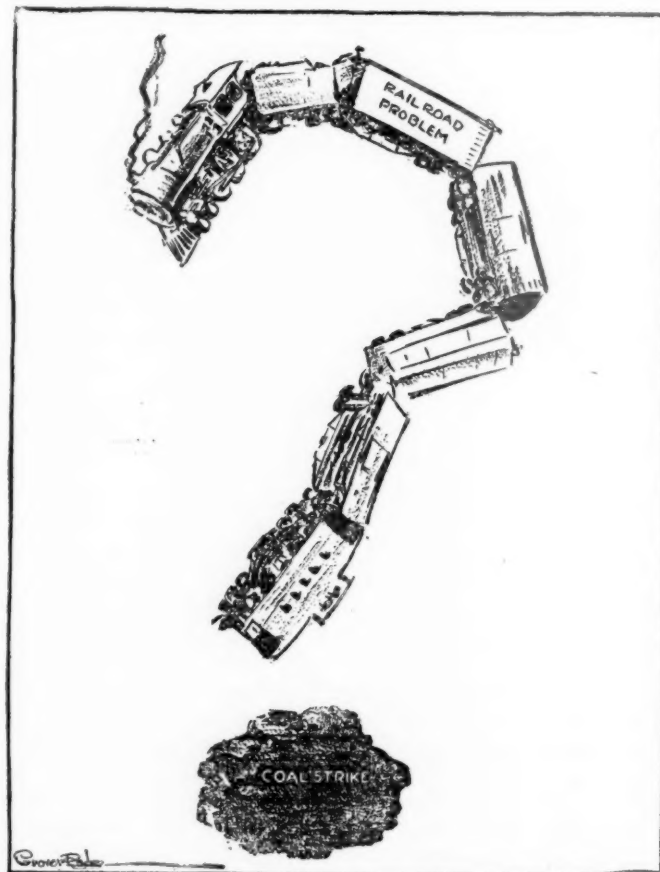
In considering the above table in connection with the first one, it would appear that the installation of a number of

working levers per year equivalent to the number of plants shown as the average per year would be a very conservative estimate of the work needing to be done along this line each year during the next three years.

### Conclusions

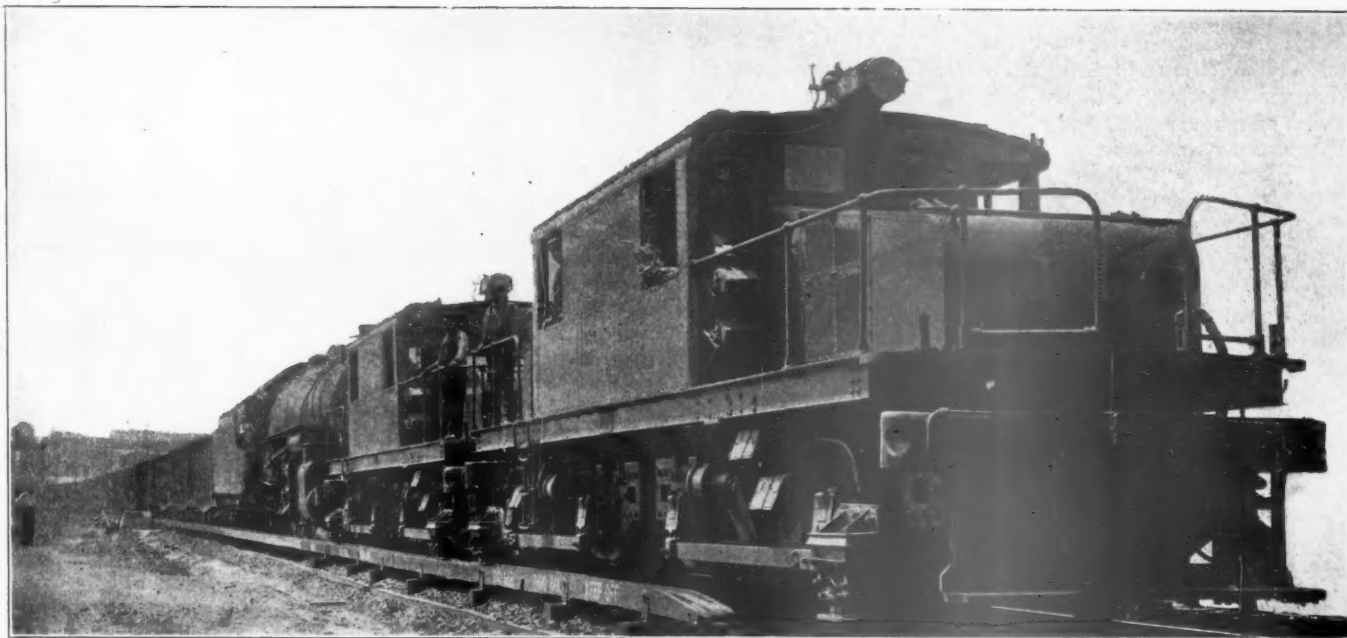
To sum up, the deficit in automatic block signaling which had accrued from 1915 to 1918, inclusive, was developed from two different angles: the deficiency per year during this period as compared with the normal construction during the 10-year period, and from a survey of the present conditions in the field. These methods gave mileages which should be installed each year for the next three years of 3,616 and 4,025, respectively, the average being approximately 3,820 miles. Assuming \$3,800 a mile as a fair average present price for such installations, the total amount which should be invested in automatic block signaling each year for the next three years is \$14,516,000, a total of \$43,548,000.

In considering interlocking construction and taking the average total number of levers installed each year, as shown at the bottom of the interlocking table, it is seen that the estimated total that should be installed during each of the next three years is 2,048. With an average price per lever of \$1,500 for all types, this will require an expenditure of approximately \$3,072,000 a year. This gives a grand total for signals and interlockings of \$17,588,000 a year, or \$52,764,000 which should be spent on this class of construction during the next three years. The estimate of expenditures which it will be necessary to make in the next three years, if conditions are to be restored to normal, takes into account signaling only. It does not take into account expenditures which should be made by the railways for highway grade crossing protection.



From the Louisville, (Ky.) Courier-Journal  
Harder Than Ever





*Electric Locomotives Have Been Handling Trains on the Baltimore & Ohio for 24 Years*

## Electricity a Help in Intensive Development

Electrical Machinery Will Aid Materially in Increasing Efficiency and Capacity of Railroads

**H**AULING TRAINS with electric locomotives is one form of intensive railroad development, and the adoption of electric operation is generally based on one or both of two general reasons. First, the difficulties and dangers of steam operation in certain tunnels and terminals may make electrical operation necessary, and, second, where facilities in a certain section prove to be inadequate it may be found cheaper to electrify than to enlarge the existing facilities. Due to the fact that heavy trains can be hauled at higher rates of speed with electric locomotives than with steam, electric operation will in effect enlarge the facilities. This was the fundamental reason for the Pennsylvania's electrification of the Philadelphia terminal. Elsewhere in this issue is an article showing the need of intensive railroad development in this country, a part of which will probably take the form of electric operation.

### New Traction Equipment

During the past year, 15 electric passenger locomotives were built for the Chicago, Milwaukee & St. Paul, and work was practically completed for extending the electrification of that road over the division from Othello to Seattle. Five locomotives were also built for the New York, New Haven & Hartford, for operation over the New York Connecting Railroad.

Ten of the new passenger locomotives for the Chicago,

Milwaukee & St. Paul are Baldwin-Westinghouse locomotives and five were built by the General Electric Company. Both types are driven by 12 motors, but the method of transmitting the power to the track in each type is very different. In the Baldwin-Westinghouse locomotive power is trans-

mitted from 12 motors to six driving axles by pinions and gears mounted on quills which in turn are connected to the driving wheels. The armatures of the motors on the General Electric locomotives are mounted directly on the 12 driving axles. The old equipment built by the General Electric Company was a spring gear type and consisted of 42 freight and passenger locomotives and four switchers. Some of the 42 locomotives were designed for passenger and the rest for freight service. Those which were designed for passenger service will be regearred for freight service and some of the 42 freight locomotives will be used on each of the two electrified divisions. The five new gearless locomotives are designed distinctly for passenger service and will be used on the Cascade division from

Othello to Tacoma and Seattle. The ten new quill-gearred locomotives were also designed for passenger service and will be used on the Rocky Mountain division from Harlowton to Avery.

The locomotives built for the New Haven are Baldwin-Westinghouse locomotives and are of the quill-gearred type.

**T**HE use of electrical equipment on the railroads is increasing so fast that few railroad officers can afford to be without a working knowledge of things electrical.

It is essential that they keep pace with electrical development so that they may know its scope and limitations and in their own fields may be able to judge whether or not a certain application will be possible, desirable or economical.

They are designed for operation on 11,000-volt, a. c. or 600-volt d. c. current and are similar to former designs except that they are equipped with 12 motors and 6 driving axles and weigh 180 tons. The former locomotives have four driving axles and weigh 120 tons.

### Reasons for Electrification

Advocates of electric traction have in the past advanced a great variety of reasons why electric operation should be adopted. Some of these reasons were well founded while others were the extravagant claims of enthusiasts. Probably the best way to decide what the sound reasons are is to see exactly what has been done up to this time. The accompanying table has been prepared for the purpose:

PRINCIPAL TRUNK LINE ELECTRIFICATIONS IN AMERICA

Name of road and section electrified	Kind of service	Cause of electrification	Began electric operation
Baltimore & Ohio, Baltimore, Md. Baltimore Tunnels.	Heavy passenger and freight.	Tunnel and terminal.	1895
New York Central New York—Harmon.	Heavy passenger.	Tunnel Terminal. Heavy service.	1906
New York, New Haven & Hartford. New York-New Haven.	Heavy passenger and freight.	Terminal heavy service.	1908
Grand Trunk, St. Clair Tunnel Co. Pt. Huron, Mich., St. Clair Tunnel.	Heavy passenger and freight.	Tunnel.	1908
Great Northern.	Heavy passenger and freight.	Tunnel.	1909
Michigan Central, Detroit River Tunnel, Detroit, Mich.	Heavy passenger and freight.	Tunnel and terminal.	1910
Boston & Maine, Hoosac Tunnel, North Adams, Mass.	Heavy passenger and freight.	Tunnel.	1911
Pennsylvania, Service into New York City Terminal.	Heavy passenger.	Tunnel and terminal.	1912
Butte, Anaconda & Pacific, Butte—Anaconda, Mont.	Heavy freight and passenger.	General economy.	1913
Norfolk & Western, Bluefield—Elkhorn, W. Va.	Heavy freight and passenger.	Heavy grade, tunnel.	1915
Pennsylvania, Philadelphia, Pa.; and Philadelphia—Chestnut Hill.	Passenger.	Relief terminal. Congestion.	1915 1918
Chicago, Milwaukee & St. Paul, Harlowton, Mont., Avery, Idaho, Othello, Wash.—Seattle and Tacoma.	Heavy freight and passenger.	Heavy grade.	1915 1919
Canadian Northern, Montreal, Can.	Heavy passenger.	Tunnel and terminal.	1917
New York Connecting, Port Morris—Bay Ridge, N. Y.	Freight.	To reduce congestion and eliminate ferry service.	1918

The reasons as outlined in the table are not the only ones responsible for the adoption of electric traction, but are the apparent reasons. From the table it appears that in the early days where steam operation became undesirable, dangerous or impossible, electric operation was adopted to overcome the difficulties. In some cases this was done without much regard for expense. Now, however it is realized that there are actual economies to be gained in the electric operation of certain classes of service, due to the fact that it provides greater continuous pulling power than steam motive power. It applies particularly where intensive development is required. To gain the greatest economies of electric operation it is necessary to make a comparatively great expenditure for equipment, since not only do electric locomotives cost more than steam units of the same weight, but it is necessary to provide substations as well as an efficient distribution system, to say nothing of power houses and transmission lines if power cannot be purchased directly at the substations.

Actual comparison between steam and electric operation is in favor of the latter for as has been pointed out by C. H. Quinn, electrical engineer of the Norfolk & Western,

eight electric locomotives have been doing the work done previously by 28 Mallets on that road. This is due partly to the fact that the hauling capacity per locomotive is increased and partly because the electric locomotives work more hours per day.

On the other hand, total costs of installation are in favor of the steam, and due to the increased interest charge incident to electric operation, there must be a decided saving in favor of the electric to induce conservative financial interests to make the expenditures, or else some other physical advantage must be the deciding factor.

To determine the advisability of electrifying requires very careful and extensive investigation. A form for such an investigation has been compiled by the Association of Railway Electrical Engineers, which will appear in their 1919 proceedings. This form was also published in the October, 1919, issue of the Railway Electrical Engineer.

### Reasons for Electrification in Foreign Countries

Electric operation in many foreign countries has received more active consideration than it has in the United States because coal is expensive or unobtainable and water power is abundant. In contrast to this, however, is the proposed



Electric Wiring for Shop Power and Light Should Be a Part of the Building

electrification of the South African Railways. Water power is not available at all times throughout the year in South Africa, but coal at the pit is cheap.

In advocating electric operation for a part of the South African Railways, Merz & McLellan, consulting engineers, outline anticipated results as follows: One of the chief reasons for electrification was the purpose of increasing the capacity of the tracks as they now stand. The investigations were based on a 50 per cent increase in traffic. This is to be brought about by the increase in the average speed at which the trains will be operated and by increasing the train load so that greater tonnage can be hauled with a fewer number of trains. As most of the sections under consideration are single track lines, a reduction in the number of trains and an increase in speed will produce a great improvement in regard to delays at stations.

With the increase in speed, according to the above-mentioned report, less equipment will be required to handle the same amount of traffic. There will be a reduction in the amount of coal consumed, with the accompanying decrease in the number of cars used for the transportation of company coal. There will be an increase in engine mileage; thus fewer electric locomotives will be required. In addition to this, electrification would, on account of increase in speed, and the reduction in fuel consumed, make unnecessary the



purchase of 1,038 new 40-ton freight cars, or their equivalent, which would be required for dealing with the increased demands under steam operation. In regard to the suburban passenger trains operated under the multiple unit system it is universal experience that such improvements in traveling facilities produce a larger volume of traffic, which is due to a growth of the population in the remoter suburbs and to more frequent use of the improved services.

The saving in working expenses according to the study for the South African Railways, involves a comparison of the cost under steam operation of coal, water, wages of train crews, enginehouse expenses, lighting and heating, locomotive repairs, and depreciation; with, under electric operation, the cost of electrical energy; wages of train crews;



Trucks and Tractors Are Available for Many Different Classes of Service

enginehouse expenses; repairs and depreciation of the locomotives and motor equipment; depreciation, maintenance and working expenses of the sub-stations, and the maintenance of the track equipment necessary for electrification. On the four divisions of the South African Railways under consideration the estimated profit for electrical operation amounts to £801,900.

More lines have been electrified in the United States for passenger than for freight service. In England, with the exception of 18-route miles of mineral line which has been electrified by the North-Eastern Railway with great success, all the electrified railways are of the suburban type in that they are worked on the multiple-unit system. These facts make the following quotation of particular interest. In his presidential address delivered before the Institution of Electrical Engineers November 13, 1919, Roger T. Smith spoke as follows:

"It has already been pointed out that this analysis only indicates tendencies, but I think it may be claimed that basing the working costs of each kind of locomotive, steam and electric, on the average train-miles hauled in a year, and placing the known increase in train-miles hauled by an electric locomotive at reasonable figures for passenger and goods respectively, the passenger electric locomotive might have difficulty in earning sufficient revenue to meet all present charges and have enough to spare to pay for electricity and for interest on the electrical equipment, while the goods locomotive could much more than do so, provided in both cases electricity is bought or produced by the railway at  $\frac{1}{2}$  d. per kw.-hour at the generating station. I must, however, insist once more that in an analysis of this sort the actual conclusion come to, which is in the form of the weight of

passenger train and of goods train (including the locomotive that can be hauled for the same working expenses now necessary for steam traction, has no intrinsic value and if applied to any individual case might be most misleading. All that the figures show is that in a typical case for the same working expenses now incurred by steam traction, electrification is more in favor of goods haulage than of passenger haulage, and among the railway economies necessary to pay the enormously increased working expenses the electrification of goods and especially of mineral lines ought to receive due consideration."

### Material Handling Machinery

The term, material handling machinery, on the railroads includes a great variety of equipment from a hand truck to the largest locomotive crane and particularly as applied to the handling of freight, baggage and shop material, its adoption is one form of intensive railroad development. It is at present demanding more attention than ever before, because of the need of intensive development and because by its adoption the capacity of a freight house, a transfer, a pier, or a shop, can be increased. An old facility can be modernized without enlarging or rebuilding it. This last applies particularly to the use of electric trucks and tractors.

The most noteworthy adoption of material handling machinery in this country is probably the installation at Cincinnati, Ohio. All the railroads of Cincinnati have made arrangements with a private operating company for the installation of a patented system of terminal operation. The



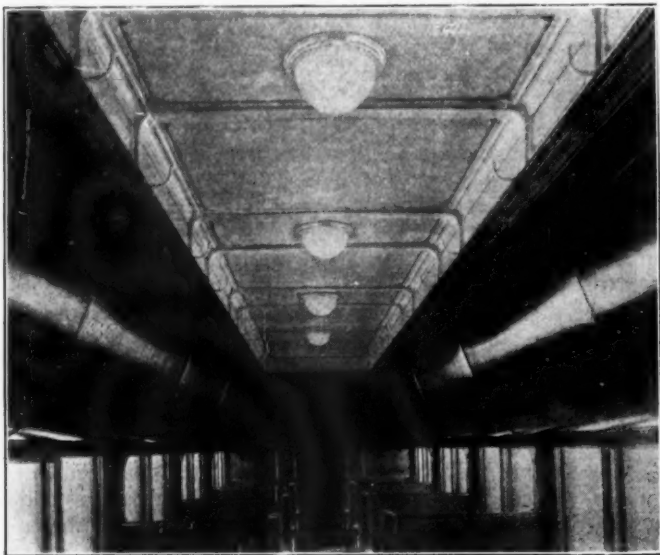
All Locomotives Must Be Equipped with Electric Headlights Before July 1, 1920

completed system will consist of a combination of motor trucks, overhead electric traveling cranes and uniform containers, with which will be combined many forms of mechanical handling machinery such as industrial electric trucks, stacking and tiering machines, portable conveyors, etc. Special equipment will also be used for moving cars and it is estimated that the system will ultimately release 66,000 freight cars, previously used exclusively in "spotting," transfer, trap or ferry service.

An even more radical departure in the method of handling freight has been proposed in England and is now receiving consideration by the British government, and this system, known as the Gattie system, would eliminate all of the 74 freight yards in London.

### Electric Trucks and Tractors

Electric trucks and tractors are now designed and built for a great variety of services. There are high and low platform trucks, drop frame trucks, various kinds of elevating platform trucks, trucks equipped with rigid and swinging cranes, trucks which perform the function of stacking



**Electric Lights Are the Only Kind Adapted to All Kinds of Car Lighting Service**

and tiering machines, and tractors for every kind of service. Each kind of truck is designed for a certain class of duty and care should be taken to pick the proper truck for the job. If this is done, remarkable results can be obtained by their use.

The railroads in general are not able to handle traffic



**The Building Up of Worn Parts by Electric Welding Reduces Maintenance Expense**

as they should and labor, whether or not it is a commodity, is at a premium. As trucks and tractors speed up the movement of traffic, displace labor and can be applied to piers, transfers, shops and storehouses without changing the

buildings, it is safe to say that many more will be put into service after the roads are returned on March 1.

### Electric Headlights

Substantial progress has been made in equipping locomotives with lights, which will meet the requirements of the Interstate Commerce Commission's orders of December 26, 1916, and December 17, 1917, the effective date of which was fixed as July 1, 1918.

Under the present order, all locomotives must be equipped by July 1, 1920, but unless the work moves forward more rapidly than it is at present, more time will be necessary.

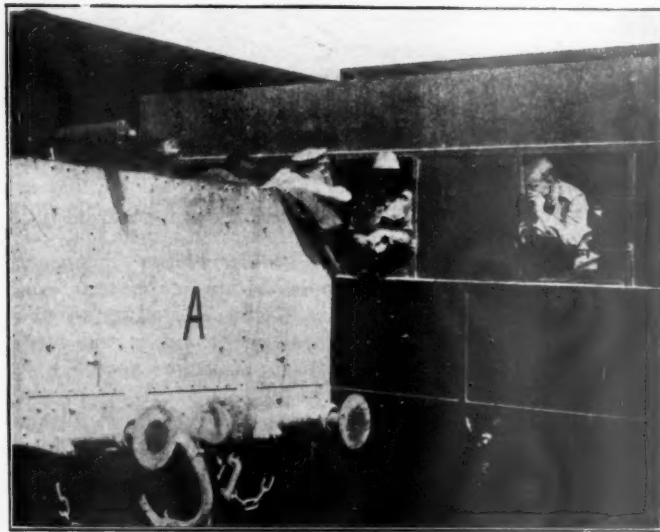
### Electric Car Lighting

The amount of car lighting equipment needed by the railroads is dependent largely upon the passenger car requirements. In another article in this issue it is pointed out that there will be 24,500 passenger cars needed in the next three years. As the largest number of cars ever built in one year in the United States and Canada was only 4,412, there will not be an immediate call for 24,500 car lighting equipments. The need will be great, however, for production may be increased and in addition to the equipment required for new cars, there will be a considerable amount required for replacement of straight storage, gas and oil lights.

### Electric Welding

Electric welding as a science has developed very rapidly during the past three years. Almost every kind of broken or fractured machinery has been repaired by electric welding and the work of advancement in the science which is needed is to extend and perfect the work. Comparatively few roads have taken full advantage of the possibilities of electric welding. It is significant, however, that when it became necessary to repair the German ships in New York harbor it was only done successfully after railroad officers had been called into consultation and employees had actually been detailed from railroad shops to assist in the work.

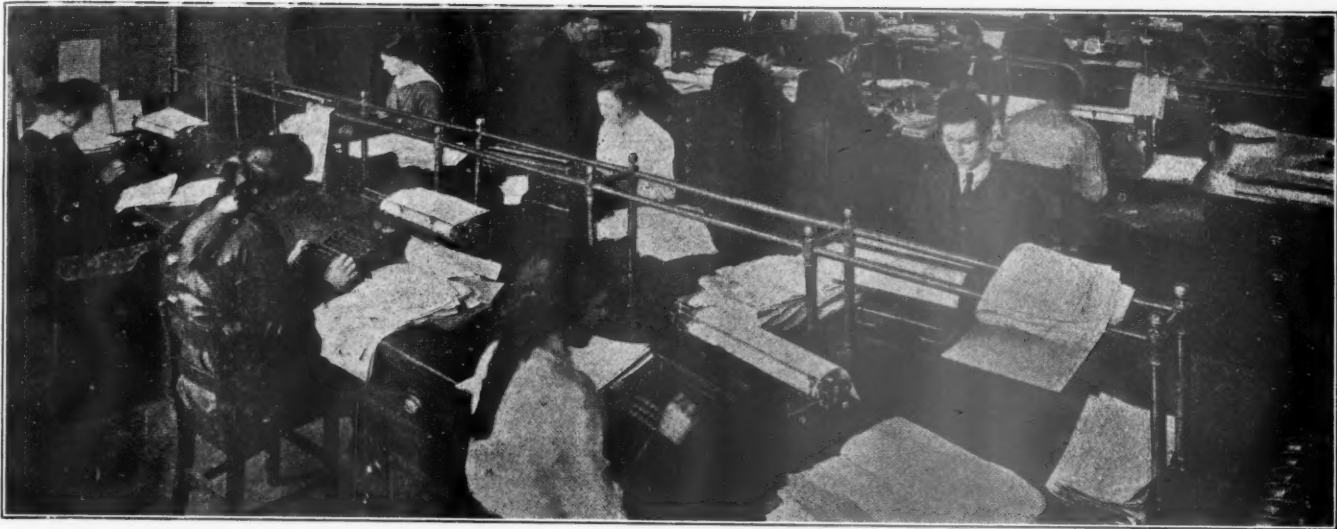
Perfection of welding work depends largely upon good supervision and the proper training of operators. If certain general rules are adopted and followed closely, the success of the work is practically assured and it is highly probable that railroad managers will use a greater amount of welding equipment in getting the railroads back to their former standards.



*Photo from International Film.*

**Armored Cars Used to Guard Passenger Trains in Egypt**





Clerks in an English Railway Accounting Office

## The Needs of the Accounting Department

### Struggle to Keep Up with Demands for Statistics by the Management and Federal and State Authorities

FIFTEEN YEARS AGO the accounting department of one of the most important eastern railroads did not have a labor saving device in its offices, with the single exception of one typewriter. This may not have been typical of the great majority of roads, but it was probably representative of a large proportion. The work required was not only far less in volume than it is now, but far less complicated. Clerical labor was exceedingly cheap and in general, plentiful.

Up to the time that the United States government took over the American railroads, station agents and clerical help were relatively among the worst paid classes of employees on the railroads. The findings of the wage commission recognized this fact and the original increase in wages to railroad employees was on a sliding scale, which gave the lowest paid man a higher proportionate increase than the others. As a matter of fact, however, as the wage increases have taken place, one after another, station agents and clerks are not now highly paid, the average monthly wage of clerks in July, 1919, was about \$112 when contrasted with men paid on an hourly basis.

This has two implications. The general demand and high scale of wages for unskilled labor make clerical work with its poor pay peculiarly unattractive, and only the least efficient workers, either men or women, are likely to stay in it. In the second place, it means that if the cost of living remains as high as it now is, there is an imminent possibility of some readjustment having to be made in the pay of the accounting forces.

The accounting department is not only a non-revenue

producing department, but it is continually after all other departments to reduce expenses with the result that economy is an ideal or an obsession, as you are minded to look at it with the department in its own work.

It must be remembered that on January 1, 1918, a new set of books was opened for each railroad brought under federal control. With the return of the railroads to their owners these books will have to be closed, but the accounts between the federal auditors and the director general on the one hand, and between the director general and the owning corporations on the other, will take years finally to settle. It is the guess of some accounting officers who are in a position to know whereof they guess, that all of the tangled accounts and disputes will not be straightened out within 25 years.

Besides these burdens, arising out of federal control, and falling on the accounting department, there are the continually increasing demands of state and federal authorities. The new classification of commodities which carriers must compile monthly and report quarterly and annually to

the Interstate Commerce Commission, for each class, and which must state the number of car loads and the number of tons originating on line and received from connecting carriers, has been increased from 38 to 70. The six monthly operating statistical reports, originated by the Railroad Administration operating statistics section, will in all probability be continued, and will be required monthly by the Interstate Commerce Commission.

Only a few of the many factors which are adding to the work of the accounting department can be mentioned in

**M**ARCH 1 will bring a flood of extra work to railroad accounting offices, which will require either large additions to the clerical force or the re-arrangement of the work through the more widespread use of labor saving accounting machines.

Making it unnecessary to take on an extra man is as truly an economy as taking off a man.

This result, however, cannot be obtained by waiting until after March 1.

detail. Past experience, however, would indicate that even were there no increase in business, the work of the accounting department would increase about 2 per cent a year and the present outlook is for an even more rapid increase than this, possibly as high as 5 per cent.

Accounting departments are now generally behind in their work. A return of the roads would tend to put them further behind. Piecemeal and temporary additions to the clerical force are both expensive and extremely unsatisfactory, while more careful training of forces implies higher remuneration as well as a considerable period of time before accomplishment can be hoped for. With every department asking for increased appropriations, the accounting department will have to show a particularly good case for any capital expenditures which it may wish to make. But it has a good case.

It is often difficult to prove to an executive officer that the installation of labor saving devices will cut down the payroll. As a matter of fact, because of the steady increase in the amount of the work required in the accounting department it almost never does. Men are not laid off because machines are installed. For this reason, new accounting machines are staved off as long as possible. It is, however, often a weakness on the part of an accounting officer to take on month by month additional employees, rather than to make a stand-up fight for labor saving devices which he feels convinced will eliminate the necessity for additions to the payroll. If the purchase of five calculating machines will make it unnecessary to add three clerks to the payroll this month, two in February, ten in March, and others later, it is short-sightedness indeed to put off the purchase of the machines. If the purchase of a calculating typewriter will permit an agent to get along without an additional assistant, there is just as real a saving, as there would be if, by the purchase of a typewriter, an assistant, already on the payroll, could be dropped.

There are two ways in which this problem can be attacked, and both methods of attack ought to be used. One is from the bottom up. The chief clerk of each division ought to make a study of the particular problems of his division and to lay the results of his study before his immediate superior, and this study should be combined with those made in adjoining divisions, and brought up to the head of the department. This is no new suggestion, of course, but often through timidity or short-sightedness, such a study is not made until an actual emergency arises, and then every one is so rushed as to preclude a scientific study being made at all. The point is that now anyone who is in close touch with the forces at Washington and in the federal and corporation accounting offices can foresee with a reasonable amount of certainty the crisis which will take place on March 1, and present actions should be governed accordingly.

The other method of attacking the problem is to have an outside report made to the executive on the operation of his accounting department. Such an investigation should be welcomed. While it is perfectly true that an outsider cannot fully appreciate the minutia of the difficulties of any one particular office, as well as the man in charge can, the very fact that his eyes view the situation cleared of such detail, gives him an opportunity to make helpful suggestions which may be of great value.

Above all, the Railway Accounting Officers' Association, and the opportunities which it affords for interchange of ideas and the study of other methods, should be made use of.

The secretary of that association is the most valuable clearing house for ideas which the accounting officer of American railroads has. In touch with the work of all of the committees, he is abreast or ahead of the best accounting practices, and is able to perform a service, which if properly availed of, will be invaluable.



**Committee on Standards for Locomotives and Cars, United States Railroad Administration**

First Row—Seated (Left to Right): J. J. Tatum, general supervisor of car repairs, U. S. R. A.; F. P. Pfahler, chief mechanical engineer, U. S. R. A.; Frank McManamy, assistant director, division of operation, U. S. R. A., and chairman of the committee; John Purcell, assistant to federal manager, Atchison, Topeka & Santa Fe; A. W. Gibbs, chief mechanical engineer, Pennsylvania Railroad. Middle Row—Standing (Left to Right): C. E. Fuller, superintendent motive power and machinery, Union Pacific; F. F. Gaines, Board of Railroad Wages and Working Conditions, U. S. R. A.; W. H. Wilson, assistant to federal manager, Northern Pacific; H. T. Bentley, superintendent motive power and machinery, Chicago & North Western; J. E. O'Brien, superintendent motive power, Missouri Pacific; J. T. Carroll, general superintendent, maintenance of equipment, Baltimore & Ohio. Top Row—Standing (Left to Right): H. Zalkind, stenographer; J. W. Small, mechanical assistant to regional director, Southern Region, U. S. R. A.; E. A. Woodworth, secretary; H. L. Ingersoll, mechanical assistant to regional director, Eastern region, U. S. R. A.





## Maintenance of Way by the Railroad Administration

Study of Limited Data Now Ascertainable Indicates That an Appreciable Decline in Upkeep Has Occurred

**A** STUDY OF THE MAINTENANCE of way practices and policies of the United States Railroad Administration is primarily a study of the practices and policies for the year 1919, for, as a matter of fact, the Administration did not start to formulate any well-defined plan for the upkeep of the properties until late in 1918. For a large part of the first year of government control, maintenance of way work was carried on by the local organizations without any definite plan of administration by either the central or regional offices. It was not until in August, 1918, that arrangements were made for an organization under the direction of C. A. Morse, chief engineer of the Chicago, Rock Island & Pacific, who was given the title of assistant director of the Division of Operation in charge of engineering and maintenance of way. Mr. Morse built up no large central organization, but conducted the affairs of the department largely through the agency of the engineering assistants to the regional directors, most of whom were appointed about the same time. Aside from their administrative duties in the several regions, these engineering assistants also served with Mr. Morse on a general committee on maintenance of way matters.

A large part of the activities of the newly formed organization during the remaining months of 1918 was devoted to the gathering of comparative data on maintenance of way work performed by the railroads during the period of government control up to that time, in the three-year test period

and in preceding years. For instance, in November, 1918, a circular was issued to the railroads requiring them to supply very detailed information concerning rails, ties, ballast, tie plates and other physical features of their lines, together with traffic statistics for each sub-division. It was explained that

this information was desired as the basis for an intelligent supervision of maintenance work.

This order and some later modifications of it, together with the financial difficulties of the Railroad Administration early in 1919, soon tended to cause some uneasiness among the officers on the individual railways, who concluded that the Railroad Administration was about to institute a drastic curtailment of maintenance expenditures. This led Director General Hines to issue a statement in February, 1919, denying that it was the Administration's intention to pursue a policy of retrenchment and reiterating the government's promise to return the properties in as good condition as when taken over.

However, it soon became evident that the Division of Operation did intend to exercise a much more rigid supervision over maintenance of way expenditures than had prevailed in 1918. Instructions were issued for the roads to submit maintenance budgets in order that they might be considered from a standpoint of their relation to expenditures in previous years. The roads were given to understand that the time required to examine these budgets would not serve to delay the work, but would provide a basis for pushing or

**A** COMPARISON of maintenance of way conditions today and two years ago presents a most difficult problem.

There are deficiencies in renewals of both rails and ties, but this deficiency is not as marked as had been supposed.

Expenditures for maintenance of way over a period of years are not directly comparable because of decreased value of dollar and reduced efficiency of labor.

All classes of maintenance of way labor are now fully organized.

curtailing the work later in the season if deemed necessary. Several obstacles developed in complying with these instructions so that a number of modifications were necessary and considerable delay was incurred before the information requested could be supplied.

#### Curtailement Instituted on June 1, 1919

No real issue with regard to maintenance of way policies took place until May 27, when Director General Hines publicly stated that the Railroad Administration was up to its contract obligation in respect to maintenance of way and issued orders tending to prevent excessive expenditures by requiring that the outlay on each road for the month of June should bear the same ratio to the operating revenues as the yearly average for the test period, except that the regional directors were granted authority to depart from this rule where cases of emergency required. This ruling was superseded the following month by specific instructions covering maintenance of way expenditures for the second six months of 1919. Nevertheless, it had already resulted in some radical curtailments of expenditures and considerable reductions in force. Moreover, the new regulations provided definite limitations, and railway officers were given to understand that the programs for the work as outlined were tentative and subject to change from month to month.

This change in the maintenance of way policy of the Railroad Administration from one of most liberal authority by the individual road to a plan for rigid control of expenditures led to a considerable undercurrent of resentment upon the part of railway officers, both federal and corporate, although much of this criticism would have been avoided if the statistical data on maintenance of way had been compiled soon enough to have permitted of the formulation of a maintenance program before the inception of the season's work. Coming in June, at the height of the season, this curtailment was particularly unfortunate.

#### Condition of Maintenance an Intangible Quantity

The condition of maintenance is an intangible quantity at best, and compliance with the provisions of the compensation contract with regard to maintenance may be subjected to wide variation as a consequence of personal equation. There is no denying that both the Administration and the railway corporate officers have recognized that in any litigation for the recovery of damages for under-maintenance or compensation for over-maintenance, the burden of proof would be on the plaintiff, and furthermore that the facts as to the condition of over or under-maintenance would be difficult to establish. This would seem to explain the common understanding of the Administration's policy with regard to compliance with the provisions of the contract, namely, that in the case of a property in excellent condition, to spend just enough to continue that condition and in the case of a depreciated property it would make expenditures equivalent to those made during the test period as equated for increased costs of labor and material.

The corporate officers of the roads have been reluctant to express themselves publicly with regard to these principles, but the representatives of the Administration, on the other hand, have repeatedly stated their position in no uncertain terms. In the testimony before the House appropriation committee, Mr. Hines evinced a subtle insight into railway management when he said:

"It has been the tradition of the subordinate official, as against his own superior officer, or as against anyone else, that he wanted to maintain his property just as well as he could, and if he could maintain his property better than the corporation wanted it maintained, he would do it, because he just naturally wants his property in the best condition he can have it, and I take it that the subordinate officials will be just as anxious to do that under federal control as they were under private control

and that they will spend all the money on maintenance that they can get to spend."

Mr. Hines also said that he thought that the railroad companies had fallen into two or three errors.

"They assume," he said, "that the standard contract obligates the government to put into the property each year of federal control, on an average, the quantities of material and labor that were put into the property on an average per year during the test period. This is not the case," he declared. "The obligation is to turn the property back in substantially as good condition, and it will be practicable on many railroads to do that without expending as large quantities of labor and material as were expended during the test period on an average, and where it is practicable the government does not have to put in a larger amount. The provision that the same quantities of labor and material may be used is not an obligation, but is an option which the government may take if it is more favorable than the other standard."

#### No Definite Statement Can Be Made

Whether or not the roads are now in as good condition as they were on January 1, 1918, is a question not to be answered by anything short of a most thorough investigation. As aptly stated by one railway officer, "No ordinary inspection, such as could be made by riding over the road, would indicate a decided difference in the standard of maintenance under federal control and that of the test period." The true answer is one that cannot be forthcoming until some time after federal control has ceased. It is, therefore, necessary to rest content with such facts as are now available on the tangible accomplishments of the Administration.

Expenditures for maintenance of way during the period of federal control have been much larger than those for any other corresponding period. In 1918, Class I roads spent \$649,595,710 for maintenance of way as compared with \$442,109,862 and \$421,775,812 for the calendar years of 1917 and 1916, respectively. For the first nine months of 1919, the outlay for maintenance on Class I roads was \$575,122,124 as compared with \$459,627,192 for the corresponding months of 1918 and \$311,096,000 as the average for the first nine months of the test years. Expressed in percentages, the 1919 expenditures were 25 per cent and 85 per cent greater respectively than those for the corresponding period of 1918 and the test period average.

These enormous differences are accountable entirely or at least in large measure by the marked advances in wages and increased costs of materials, and one plan of the Railroad Administration officers in charge of maintenance of way has been to develop factors to represent these increases so that they might be applied to the expenditures as a means of obtaining a more workable basis of comparison between the expenditures during federal control and those of previous years. Railway corporate officers are inclined to the opinion that such factors do not tell the whole story unless some allowance is made for the decreased efficiency of labor at present and for the larger percentage of non-productive time under the eight-hour day.

#### The Rail Renewals

With the possible exception of the question of ties, the subject of rail renewals has probably given rise to more differences of opinion and criticism of the Railroad Administration than any other single phase of maintenance of way, but from the facts available it would seem that this had been largely brought about through a lack of definite information on the real status of the rail situation and a misunderstanding of the Administration's motive. From the data presented below, it would appear that the roads as a whole are not as far behind in the rail renewals as had been supposed.

At the time that the roads were taken over by the government, there were orders from the railways on the books



of the mills for 2,333,190 tons of rails, while the roads had 462,529 tons of rail on hand. Priority of other materials for the rolling capacities of the mills made it possible to obtain delivery on only 1,212,618 tons in 1918. During that year the roads laid 1,111,638 tons of new rail, leaving a stock on hand at the beginning of 1919 of 563,509 tons and orders for rails undelivered to the amount of 1,120,491 tons. With such a large tonnage still undelivered there was not much occasion for the Administration to place orders for considerable additional tonnage, but on May 17 one order for 200,000 tons was placed and in November a second order for 41,000 tons was awarded. During 1919, the mills made deliveries to a total of 1,161,491 tons, leaving an undelivered tonnage at the end of the year of about 200,000 tons. It is estimated that about 1,350,000 tons of new rail have been laid in maintenance of way during 1919 so that there will be a stock on hand at the end of the year of about 375,000 tons.

The significant figures in the above are the laying of 1,111,638 tons of rail in 1918 and 1,350,000 tons in 1919 together with a reduction in the stock of 462,500 tons minus 375,000 tons, or 87,500 tons. The performance in laying should be compared with the following statistics for past years.

Average amount of new rail laid for maintenance in seven-year period .....	1,405,857
Average amount of new rail laid for maintenance in ten-year period .....	1,377,569
Average amount of new rail laid for maintenance in three-year test period .....	1,328,316

From an inspection of these figures it is clear that the test period is not a fair basis for determining the deficiency of rail renewals at the present time, and, as there is no reason to assume that the renewals during the seven-year period preceding the test period were excessive, this seven-year period would appear to offer the best standard for comparison. On this basis, the average deficiency for the test period is 1,405,859 tons minus 1,328,316 tons, or 77,543 tons, which amounts to 232,629 tons for the three years. A similar computation gives a deficiency of 294,221 tons for 1918 and 55,859 tons for 1919, or a total of 350,080 tons for the two years of federal management, not including the decrease of 87,500 tons in stock. If we are to assume that the tons of new rail laid in the second half of 1917 (i. e., the twilight zone between the test period and the period of federal control) is one-half of the annual average for the test period, then the total deficiency in rail renewals at the present time is 232,629 tons plus 38,771 tons plus 350,080 tons, or 621,480 tons.

### The Tie Situation

A discussion of the tie situation at the present time and of the practices of the United States Railroad Administration with respect to tie purchases and tie renewals must be essentially a discussion of the work of Forest Products Section of the Division of Purchases, United States Railroad Administration, for this body, in co-operation with the regional purchasing committees, virtually controlled the tie from the time that it was delivered by the "hacker" until it was ready for placing under the rail. Organized long before the maintenance of way activities of the Administration, it played an important part in federal control and its activities have been subjected to much adverse comment.

The Railroad Administration has been severely criticised for instituting a plan under which the producers were confronted with the necessity of disposing of their product according to the terms offered by a single important purchaser. Whatever objections are raised with respect to the methods pursued by the Forest Products Section, the conditions in the early days of 1918 pointed definitely to the need of a central organization, for with the demand far exceeding the

supply in sight, the roads were bidding against each other for what ties were to be had, with the result that the prices rose rapidly and there were frequent complaints of the non-delivery of orders placed at lower prices, presumably because the contractors were disposing of their stocks on more favorable terms.

It has been contended by the tie contractors that the complete revision of practices which was brought about caused such an upheaval in the industry as to effect a most distressing influence on production. The Administration forces have inferred that the only class to suffer was the jobber or middle man and that the real producer, whether large operator or small, was fairly treated. They have also maintained that their plan offered the only feasible arrangement that would insure a fair distribution of the available supply and obviate gross exploitation of the roads.

The activities of the Forest Products Section were not limited solely to the procurement and distribution of ties. The section was also called upon to supervise the distribution of timber preserving material. There is no question but that these measures made it possible to obtain a larger output from the treating plants than would have been possible with the available supply of materials controlled by a limited number of treating companies. In this connection the section also drew up and put into effect a set of standard specifications covering the more common used processes involving the use of creosote and zinc chloride and combinations of the two.

### What Has Been the Result

The production of ties in 1918 for use on the roads under government control, according to figures issued by the Forest Products Section, was considerably less than the normal production, the total being 65,499,720 ties. Based on totals complete to November 1, 1919, the estimated production of ties for the second year of government control is 94,775,000 ties. The stock on hand at the beginning of government control was 44,420,691 and, owing to the limited production during 1918, this stock had been reduced by the end of that year to 36,556,400 ties. With the increased production during 1919, it is estimated that the supply on hand at the end of that year was something over 50,000,000. In the case of treated ties, the number subjected to preservation in 1919 is estimated at 55,000,000, while the number of ties on hand awaiting treatment on November 1 was 21,805,220.

In the matter of insertions in track the following table shows the renewals for 1918 and the estimated renewals for 1919 in comparison with the renewals of the three test years and the averages for the ten-year period.

RECORD OF TIES INSERTED ON ROADS UNDER FEDERAL MANAGEMENT

Ten-year average .....	92,293,395*
Test period average .....	94,835,443
1915 } year ending June 30.....	101,931,879
1916 } .....	98,211,454
1917 } .....	84,610,248
1918 .....	86,400,021
1919 (to November 1—76,580,185)....	85,000,000 (Est. for the year)

\*The total "average test period" includes 84 small roads with 6,847 miles and 1,625,896 ties, which roads do not enter into the total "average ten years" because of incomplete reports.

Since the average for the ten-year period, as explained by the footnote on the table, is not directly comparable with the rest of the table, obviously it cannot be used as a basis of comparison, and since there is no reason to believe that the tie renewals during the test period were excessive, the average for the test period would seem to offer the only available basis for comparison. This would indicate a deficiency in tie renewals during the two years of government control of about 18,000,000 ties, to be adjusted on the basis of a comparison between the stock of ties on hand at the beginning and the end of government control. This deficiency, however, does not express the full extent to which tie renewals are in arrears, for by examining the table it

will be noted that the renewals for the last year of the test period were very low, and furthermore no account is taken of the six months from June 30, 1917, to January 1, 1918, during which time the renewals presumably were not made at a greater rate than during the preceding year.

The discussion above has been based entirely on a comparison of quantities, whereas there has been no little comment on the tie situation with respect to the qualities. One of the most pronounced influences of the Administration's plans for tie allotments was to effect a very pronounced change in the distribution. During the past two years many roads have inserted in the tracks ties of species which never before were used in the particular locality.

One of the most notable cases of this was the shipment of a large quantity of Douglas fir trees to the eastern states. As a consequence of these circumstances there can be no question but that a considerable number of ties have been sent to sections of the country having climatic conditions not conducive to longevity of non-native timbers. It is also a fact that those roads which have been the best organized in the purchase, distribution and care of ties had their methods very largely upset by the government interference. On the other hand, the Forest Products Section's organization for the inspection of ties has resulted in a uniformity of quality the country over never before obtained, and it is certain that the roads which have normally followed rather loose practices with regard to the inspection and procurement of ties have been forced to accept a better quality of ties during the past two years than they formerly received.

While the centralized purchase of ties is undoubtedly an unworkable arrangement under private management of the roads, many of the practices introduced by the Forest Products Section can well be retained, and it is hoped that those roads which have been receiving a better quality of ties than they did under private management will profit by the lesson of government control.

#### As to Labor

Maintenance of way labor gained decisive victories in 1918 through the wage advances, the recognition of its organizations and the establishment of working rules as a part of the supplements to the general wage order. Labor activities in 1919 may well be compared to those of an attacking force which, having gained in its objective, devotes its energies to the strengthening of its position. All class of maintenance of way employees, including those of the grade of foremen, are now thoroughly organized in most parts of the country. This has been manifested publicly by the two-weeks' conference of the Brotherhood of Maintenance of Way Employees and Railway Shop Laborers at Detroit during the month of September and officially through the conclusion of an agreement between this same organization and the United States Railroad Administration on a set of rules and working conditions made effective on December 16.

In certain districts the new union has endeavored to emulate the practices of the older brotherhoods in railway service, and division officers are being compelled to devote a considerable portion of their time to hearings of grievance committees. Fortunately these tendencies are not general.

In spite of increased wages, shorter work days and recognition of the unions, employment in the maintenance of way department seems to be little more attractive today than it was three years ago. It may be that the shortage of help and the lowered efficiency so prevalent in this department is but a local manifestation of a national condition and that it cannot therefore be ascribed to any peculiarity of the management obtaining on the railroads during the last two years. Whatever the cause, there is no phase of maintenance of way work that offers a greater field for improvement than that represented by employment and personnel.

## Gridiron Satire

THE FAMOUS GRIDIRON CLUB of Washington, D. C., presented a birdseye view of our experiences in government control at its annual dinner recently. Members of the club, principally Washington correspondents, took the parts of the actors in brief skits which "gridironed" many topics now occupying the attention of the public, among them the railroad problem.

The railroad skit dealt with "unscrambling the railroads." The actors represented William G. McAdoo, former director general; Director General Walker D. Hines, and an investor. The "gridironing" follows:

McAdoo—"The late Mr. Hogan said that you cannot unscramble scrambled eggs. He was wrong. By the exercise of a little magic, to which we modestly lay claim, we shall illustrate how the railroads of the United States may be scrambled and then in the twinkling of an eye, as it were, and so to speak unscrambled again. Can any one loan me a silk hat? I shall return it promptly and entirely undamaged."

(Man steps forward with silk hat. He is Mr. Investor, a well-known citizen.)

McAdoo—"I shall return it with its pristine beauty untarnished."

Investor—"Please be careful. That hat represents the sale of a Liberty Bond."

McAdoo—"Tut, tut—have no fear—we shall not hurt it in the slightest. I shall break this egg into the hat—so—" (breaks and drops egg and shell into the hat.)

Investor—"Oh, my hat!"

McAdoo—"Tut—tut—sir. Have no fears. Trust me. Kindly turn your back. What you don't see won't annoy you. Now we take another egg and break it—so. Now we take some flour—add some coal—pour in some of this agreeable variety of ketchup—add a little sand—and finish with a dash of vinegar. Please don't groan, Mr. Investor. It is all right. All these ingredients are symbolic, gentlemen. Now we have the roads scrambled. This completes my part of the trick. I shall now pass the buck—I mean the hat—to my friend, Mr. Hines, who will, in his magic way, with a few passes produce the beautiful rabbit known as government operation and control, and return the hat undamaged to my good friend, Mr. Investor." (Investor groans.)

Hines (looks and glares at McAdoo)—"I am deeply indebted to Mr. McAdoo for his trust and confidence. I wish he had finished the trick. He hates the limelight and likes to retire while the retiring is good. But to the trick, gentlemen. Let me first cover the hat for esthetic and olfactory reasons. It is a little messy." (Covers hat with handkerchief, seizes wand.)

Hines—"I now make these mysterious passes—so—saying the cabalistic words—Hocus-pocus—1920—Brotherhoods—As Taught Me by Mr. McAdoo. Then I quickly raise the cloth and there we have—" (starts back, looking nervous). "Ah, I see, Mr. McAdoo forgot something. Let me add the Plumb plan." (Drops three plums and breaks another egg. Investor groans and tears his hair.)

Hines (continuing)—"Now we have it. Hocus—pocus—1920—presto." (Takes up handkerchief, looks—starts back, rushes to McAdoo, saying:)

Hines—"My God, Mac, I can't do the trick."

McAdoo—"That's your affair—not mine."

Investor—"My hat, my hat!"

McAdoo—"Give him back his hat."

Hines—"But this mess—what will I do?"

McAdoo—"Oh, hand it back. He can't kick."

Hines—"Here you are, sir." (Hands hat to Investor, who takes it and yells:)

"Investor—"What a mess! Oh, my hat! I can't use it. I can't clean it. I can't sell it. I can't give it away."

McAdoo and Hines—"Take it up to Congress. They'll fix it for you." (Both link arms, bow and go off.)



Photo from Keystone View Company.

Inclined Electric Railway Running to Corcovado at a Level of 1249-ft. Near Rio de Janeiro, Brazil



# A Review of the Policies of the Railroad Administration

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Special Emphasis Has Been Placed  
on Those Features  
Which May Be Used to Advantage  
Under Private Operation



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**Walker D. Hines, Director General of Railroads, United States Railroad Administration**





Walker D. Hines  
Director General



W. T. Tyler  
Director, Operation



T. C. Powell  
Director, Capital Expenditures



T. C. Prouty  
Director, Accounting

## Two Years of Government Operation

Results Appear More Favorable  
If Not Contrasted with  
Predictions of Government  
Ownership Advocates



Henry B. Spencer  
Director, Purchases



E. Marvin Underwood  
Director, Law



Edward Chambers  
Director, Traffic

IF THE GOVERNMENT'S CONTROL of the railroads during the past two years had not been preceded and for a considerable time accompanied by such extravagant predictions as to its success by the advocates of government ownership, who viewed it in the light of a panacea for all the real and fancied evils, difficulties and inconveniences which attend the transportation business, and by those who with the practically unlimited powers conferred upon them by the federal control act foresaw such great possibilities from the unification and standardization of a railroad system of 260,000 miles, the popular verdict as to its accomplishments might now be somewhat more favorable than it is. All indications point to an overwhelming desire on the part of the American people, except that part represented by the railroad labor organizations who have reasons of their own for demanding that railroading by appropriation be continued, and one or two of the more radical farmers' organizations that for some reason have seen fit to support them, to have the railroads returned to private operation as speedily as possible. It is



Max Thelen  
Director, Public Service



Swager Sherley  
Director, Finance



W. S. Carter  
Director, Labor



G. G. Tomlinson  
Director, Inland Waterways



Brice Clagett  
Asst. to Director General

apparent, however, that the spirit in which the opinion that private management should be restored is expressed is somewhat different from that in which the same idea was being voiced a year ago.

After a year of operation by the Railroad Administration, the sentiment against government railroading, on the part of those who were directly or indirectly affected without having a detailed knowledge of the situation, was largely inspired by disappointment and surprise that the government had failed to make good on the advance notices of the government ownership propagandists. Instead of huge savings resulting from unification, such economies as were effected were swallowed up in wage advances or in other war-time increases in the cost of operation. Instead of reductions in rates a large advance was required and was promptly put into effect. Instead of better accommodations for shippers and passengers the service, except to the most essential war industries, was deteriorated both by the necessity of giving preference to essential freight and by the growing shortage of facilities, while patrons of the railroads felt the effect of a lack of the former solicitude for their wants or requirements which resulted from centralization and lack of competition.

Instead of keeping labor satisfied the open-handed policy of a director general, who was generally recognized as a presidential candidate, seemed merely to inspire fresh demands. Some criticism of the Railroad Administration undoubtedly even resulted from the fact that it was less susceptible to political influences than some people would have liked, as certain governors and other state and municipal officers had occasion to learn, because those responsible for the operation of the railroads found it necessary to retain as their subordinates men who knew more about railroading than about politics, and the few politicians in the organization were not readily accessible on all occasions. Railroad officers on many occasions derived considerable satisfaction from being able to inform public officials that something they wanted would be grossly discriminatory.

While some of these manifestations of government railroading have continued into and through 1919 there has been a marked change in the situation. Instead of an aspirant for political preferment we have had as director general of railroads a trained railroad executive who has fully appreciated his responsibility and duty as a government officer and who had advanced sufficiently high in his own profession to be independent of any influence not commended by his own judgment. The task laid upon Mr. Hines was an entirely different one from that which faced Mr. McAdoo. While the former director general was given charge of the railroads for the purpose of getting the highest degree of efficiency out of them for war purposes, and while he assumed the additional burden of trying to revolutionize and reform them at the same time, Mr. Hines' job has been that of trying to restore normal conditions and to render an adequate railroad service day by day.

If he has not succeeded in overcoming all the objections to government operation which took form during the tenure of his predecessor, there are some at least who are beginning to recognize that even the government cannot make bricks without straw; cannot increase wages without increasing rates without incurring a deficit, and cannot furnish a 100 per cent car supply at all times without having money to buy new cars from time to time. There are, of course, many others who are fully convinced by this time, if they were not before, that the government is not organized to make the best bricks with what straw it has and that with the best intentions and the greatest ability a director general cannot make unlimited capital improvements when Congress both delays and reduces his appropriations.

If two years of government operation have brought these lessons home to the American people it will doubtless have accomplished as great a reform as Mr. McAdoo ever intended. There was a time when a large element of the public doubtless believed the claim of the railroad employees that their wages were inadequate, but the same people objected vigorously to the increases in rates which were needed to pay the wages demanded by the most highly organized employees. Those who complained most bitterly about car shortage were usually the same men who were loudest in demanding that the Interstate Commerce Commission keep down the freight rates when the railroads asserted they could not raise sufficient new capital under existing rates.

And when railroad officers tried to point out some of these facts they were told that if they could not increase wages, add to their facilities and at the same time reduce rates they had better step aside and let the government do it. It is not necessary to accuse the Railroad Administration of extravagance and gross inefficiency to point out that it has failed to fulfil the predictions made for it.

If the deficit of the Railroad Administration as compared with the standard return has been greater in 1919 than in 1918 it has been because the wage increases ordered in 1918 did not show their full effect last year, because they necessitated further readjustments which added large sums to the payroll, because the volume of traffic has been smaller than in 1918, and also because Mr. Hines and the President adopted the policy of refusing to take advantage of their power to advance freight rates on the ground that the deficit due to the falling off in traffic following the armistice should properly be charged off as a part of the war cost, and that it was preferable for the government to pay the deficit from the treasury for the time being rather than do anything to increase the cost of living during the readjustment period. Therefore the work of bringing up the rate level to its proper relation to the scale of expenses has been left for the companies after the return of the roads, although Mr. Hines has offered the assistance of his traffic department in making the necessary studies.

The year 1918 in the railroad business was one of reorganization, scarcity of labor and materials, and of emergency operation to keep up with the demands of the war machine and of the new methods incident to the policy of reorganization, unification and standardization, which was carried to such lengths that to many it appeared that the government intended to keep control of the railroads indefinitely. The past year has been one of readjustment and of effort to restore something like normal conditions, although the proposed reconstruction which was so much talked of a year ago has been mainly postponed as to the railroads as well as in other directions.

#### Successful Transportation Service the Object

When Walker D. Hines was appointed director general of railroads on January 1, after having served for a year as assistant director general, he issued a statement to the public in which he announced his policy in part as follows:

"From the first day of government control of the railroads I have been part of Mr. McAdoo's administration, and it will be my purpose as director general to carry forward the policies he has so ably put into effect—fidelity to the public interest, a square deal for labor, with not only an ungrudging but a sincere and cordial recognition of its partnership in the railroad enterprise, and fair treatment for the owners of railroad property and for those with whom the railroads have business dealings.

"Until the signing of the armistice the government's first railroad duty was to run the railroads to win the war, but now that the war has been won the government's railroad



job is to render an adequate and convenient transportation service at reasonable cost. There can be no greater civic triumph in time of peace than the performance of a successful transportation service for the 100,000,000 producers, consumers and travelers in this country. To participate in the achievement of this great object I invite all railroad officers and employees with whom I have had the great privilege of co-operating in their splendid war work."

The performance of a successful transportation service has been the one object toward which Mr. Hines has constantly and conscientiously striven. As far as his description of Mr. McAdoo's policies is concerned, he has followed them faithfully, although some of those he did not mention were perhaps allowed to fall into the background and were supplanted by those of Mr. Hines' own making. He has not introduced many innovations, as is indicated to some extent by the fact that while Mr. McAdoo in 1918 issued 57 general orders, the latest issued by Mr. Hines was No. 65, although he has, of course, issued a number of amendments or supplements to previous orders.

#### **Appropriation Delayed and Reduced**

One of the first steps taken by Mr. Hines after he became director general was to try to straighten out the finances of the Railroad Administration by obtaining some money with which to pay its bills and to assist the railroad companies in financing necessary additions and betterments. Whereas Mr. McAdoo started out with the cash on hand of the railroad companies and a revolving fund of \$500,000,000 and did not have to square his accounts with the railroad companies before he left office, Mr. Hines was immediately faced with the necessity of asking Congress for an appropriation to cover the deficit and to provide funds for capital improvements. On January 24 he sent to Congress, through the Secretary of the Treasury, an estimate of \$750,000,000, and when Congress failed to pass the bill and a later estimate was submitted it was necessary to increase the amount to \$1,200,000,000. The reduction of this amount to \$750,000,000 made it impossible to carry out even the modest program of capital expenditures that had been delayed by the failure of the first appropriation bill. The amount and character of the capital improvements made during the year, as far as shown by the available reports, is given elsewhere in this issue.

No new cars or locomotives were ordered during the year by the Railroad Administration. In fact, not quite all of the equipment ordered in 1918 has been delivered, because the failure of the appropriation bill made it necessary to slow up the manufacture. During the early part of the year cars were not needed and the equipment already ordered was being delivered faster than the railroad companies wanted to accept it. Moreover, the uncertainty of the government's tenure prevented making plans for the future. Designs had been prepared for standard stock, refrigerator and general service cars, and designs have recently been completed for a standard caboose; if the appropriation had been promptly granted some cars of these types probably would have been ordered. An order for 200,000 tons of rail was placed during the spring, and during the fall arrangements were nearly completed for placing another order for 200,000 tons, but after the steel strike was called only 41,000 tons were ordered.

#### **State Commissions and Shippers Conciliated**

Another of the first steps taken by Mr. Hines to indicate that he was trying to restore normal conditions was the creation of a separate Division of Public Service, of which Max Thelen, former president of the California railroad commission, was made director, and the undertaking of negotiations for the purpose of improving the relations with the state commissioners, which had been somewhat neglected

during 1918. It was announced that the scope of the Division of Public Service would be to deal with the relationship between the public, including the shippers, and the Railroad Administration and the railroads under federal control.

After conferences with the state commissioners Mr. Hines announced that it would be his policy to cause their orders to be carried out as to matters of local service, safety and equipment, although he insisted on retaining the responsibility as to rates, because he was responsible for the revenues. The state commissioners were disposed to insist on their right to settle intrastate rate matters, but an agreement was reached providing for a test suit before the Supreme Court, and although the case was decided in favor of the director general his attitude of seeking the co-operation of the state authorities resulted in the removal of considerable friction.

Immediately after the armistice Senator Cummins had introduced a bill to restore the rate-making authority of the Interstate Commerce Commission for the deliberate purpose of preventing the Railroad Administration from making another summary increase in rates, and the bill was promptly passed in the Senate, but by the time the House got around to considering it Mr. Hines had indicated so plainly his intention of proceeding considerably and of working in co-operation with the Interstate Commerce Commission as to important rate matters that the House allowed the bill to be delayed, and after the President had vetoed it very little interest was displayed in the matter. However, the fact that the bill was pending was one of the reasons given by Mr. Hines for not taking up a rate advance, and it is perhaps possible that if it had not been proposed his course would have been different.

Relations with the shippers were also improved in many ways by the earnestness displayed by Mr. Hines in endeavoring to remove the causes for complaint which resulted from the rather hasty adjustments that had been put into effect following General Order No. 28.

#### **Efforts to Restore Normal Conditions**

One of the early moves made by the Railroad Administration in the direction of the restoration of normal conditions was the issuance of a circular in February by W. T. Tyler, director of the Division of Operation, directing a relocation of freight equipment more nearly in accordance with ownership than had been practicable during the continuance of the war conditions. This provided to a greater extent for the use by the owners of equipment of their accepted standards and also for the return of cars to the owning road for rebuilding, the application of betterments and repairs. Later on the distribution of cars and the issuance of embargoes by the Car Service Section was decentralized to a considerable extent by being placed more directly under the jurisdiction of the regional directors, and in general much more opportunity for "railroading at home" was afforded than had been the case in 1918.

On March 1 and at various later dates orders were issued which had the effect of restoring pre-war conditions by undoing to some extent the "scrambling" of the railroads which had been done the year before by restoring parts of several large systems to the regions in which their principal lines were located and regrouping many lines that had previously been put under the same management with some of their competitors. This regrouping was particularly manifest in the Southwest.

Railroad corporation officers were very anxious to have the Railroad Administration take some measures to restore to its former channels traffic that had been diverted to other lines during the war. It does not appear that very much was done along this line except to restore to shippers a large

degree of their former control over the routing of their freight, not by direct order but in practice, by refraining from placing restrictions upon the routing except for special reasons.

At the earnest request of shippers the war-time demurrage rates were reduced to the old basis, effective on August 1.

### Passenger Service

Passenger service, which had been greatly curtailed during the war, which had been the cause of many complaints, was considerably improved during the year both by restoration of trains that had been taken off and by the restoration of parlor cars and observation cars and of the a la carte dining car service on many trains in place of the standardized table d'hôte meals. A limited amount of advertising for passenger service was also undertaken. The marked shortage of passenger coaches and of Pullman cars continued, however, as there had been little addition to these classes of equipment for several years, and during the early part of 1919 the troop movement incident to the demobilization of the army was as great, if not greater, than it had been during the war.

The handling of the troop movement, under the direction of the Troop Movement Section, has called forth a large amount of praise from those who have been most familiar with the accomplishment. From May 1, 1917, to December 1, 1919, a total of 15,724,058 soldiers were moved by the railroads, making a total of over 7 billion passenger miles.

### Traffic

Whereas in March the number of surplus freight cars was greater than had ever been recorded, in October the volume of freight traffic was the largest ever recorded for a month, reaching a total of 40,343,750,000 net ton miles, an increase of 1.3 per cent over October, 1918, whereas that month had shown an increase of 3.5 per cent over October, 1917.

For the eleven months period ended November 30, 1919, the net ton miles of revenue and non-revenue freight aggregated 361,331,207,000, as compared with 403,367,933,000 in the corresponding period of 1918, a decrease of 10.4 per cent, and as compared with 395,382,053 in 1917. The net ton miles per mile of road per day in the first eleven months of 1919 averaged 4,689, as compared with 5,227 in the corresponding period of 1918, and 5,180 in the corresponding period of 1917. The train miles decreased 11.8 per cent as compared with 1918, but the total car miles decreased only 6.6 per cent. The average number of unserviceable freight cars was 7.2 per cent of the total as compared with 5.8 in the corresponding period of 1918, and 5.7 in 1917.

The net ton miles per mile of road per day in the first eleven months of 1919, as compared with 1918 and 1917, were as follows:

	1919.	1918.	1917.
January .....	4,275	3,878	4,770
February .....	4,002	4,591	4,511
March .....	4,059	5,273	5,192
April .....	4,134	5,471	5,257
May .....	4,524	5,226	5,617
June .....	4,615	5,423	5,694
July .....	4,878	5,487	5,441
August .....	5,075	5,691	5,351
September .....	5,625	5,731	5,217
October .....	5,651	5,584	5,385
November .....	4,711	5,155	5,298
Eleven months .....	4,689	5,227	5,180

The number of passengers carried one mile is shown thus far only in the reports for nine months, during which time it aggregated 34,949,294,185, an increase of 6.7 per cent over the corresponding period of 1918. Preliminary reports for October indicate a substantial increase in October, 1918.

### Car Supply

During the first part of the year, because of the falling off of traffic after the armistice, a very large surplus of freight

cars accumulated, amounting in March to about 500,000. By September 1 this had given place to a car shortage, and during July and August there were numerous complaints of local shortages, particularly of open top cars. While the statistics of car surpluses and shortages have not been given out regularly, Max Thelen, director of the Division of Public Service, stated in an address recently that there was a shortage on November 1 of 57,160 cars. This compares with a surplus of 91,691 cars on November 1, 1918, and a shortage of 141,466 on November 1, 1917.

The heavy loading and prompt release of cars which increased the efficiency of the car supply in time of war was not continued during 1919, after the patriotic impulses inspired by the war had become somewhat cooled and after the regulations of the Food Administration requiring heavy loading had expired. For the eleven months ended November 30, the net ton miles per loaded car averaged 27.8, as compared with 29.2 during the corresponding period of 1918, and 26.9 in 1917. This, naturally, had a tendency to pull down the record for increased trainloading, but for the eleven months period the average net ton miles per train mile still showed an increase from 682 in 1918 to 693 in 1919. In the corresponding period of 1917 the average was 656. The average car miles per car day for the eleven months period was only 23.2, as compared with 24.8 in 1919 and 26.6 in 1917, but this average was brought down by the large number of idle cars in the early part of the year. For October the average was 27.3 as compared with 26 in October, 1918, and 25.9 in October, 1917.

### Bad Order Cars

One of the points on which the Railroad Administration has received criticisms during the year has been the large number of bad order cars. During the early part of the year, when business was at a low ebb and when every effort was being made to reduce expenses, the cars needing repairs began to accumulate. Shop hours, which had been kept at 60 to 70 a week during the war, were reduced to 48, partly to reduce expenses and partly to relieve the heavy strain under which the men had been working. Later as traffic began to pick up the hours of the car repair forces were increased in the effort to put the equipment in shape for the heavy grain and coal traffic, but the strike of the shop employees interfered, and for a time there was considerable complaint. From August 16 to November 15 the number of bad order cars was reduced from 228,549 to 130,833, but these figures probably do not tell the entire story of the condition of the equipment.

### Preparations for Return

After the President's announcement in his message to Congress in May that the railroads would be returned at the end of the year the Railroad Administration began to make some preparations for the return, and for several weeks recently, even after the question of the date became uncertain, it has been proceeding on the assumption that it might be expected to terminate its work on that date. Therefore, many preparations were made with that end in view.

Effective on October 1 per diem settlements for the use of freight cars were restored, in accordance with the code of per diem rules in effect July 1, 1918, with some exceptions. This was done in order to promote the policy of getting cars relocated on home lines to a larger extent, in accordance with the wishes of the corporate officers.

Also the regional and district traffic committees were instructed to clear their dockets of pending subjects, so far as possible, before the expiration of federal control. Instructions were issued to see to it that all contracts for purchases provided for freeing the government from any obligation after the date of its relinquishment of the railroads.



In anticipation of the early return of the roads efforts have recently been made both by the companies and by the administration to expedite the work of reaching agreements with the railroad companies on their compensation contracts, as is indicated by the list of contracts published elsewhere in this issue, which shows that approximately \$750,000,000 of the \$940,000,000 of annual rental has been covered.

Some of the more recent steps in the direction of preparation for the relinquishment have been the following:

An inventory of the property taken over by the government was ordered to be taken and brought up to December 31. It will now be necessary to extend this to March 1.

Conferences have been held with the American Railroad Association and with the corporate officers in an effort to decide which of the practices or organizations developed by the Railroad Administration shall be retained.

Effective December 1, the provisions of several general orders relating to passenger accounts were cancelled, and the practices in effect on December 31, 1917, relating to the apportionment of revenue from interline passenger traffic were reinstated.

Many of the provisions of the order relating to the use of universal interline way billing also were modified in order that the freight revenues at the end of federal control might be restated and allocated between the director general and the companies in a manner comparable to the stating and allocation of freight revenues at beginning of federal control.

An entirely new function was imposed upon the Railroad Administration by the strike of the bituminous coal miners. Because of the paramount need of the railroads for fuel if other consumers were to be supplied at all, and because it had a nation-wide organization and had had the foresight to make plans for meeting the crisis, while the organization of the Fuel Administration had been practically disbanded, the Railroad Administration was designated as the agent of the Fuel Administration and placed in charge of the allocation and distribution of coal. This task it seems to have performed with a marked degree of success, although, as

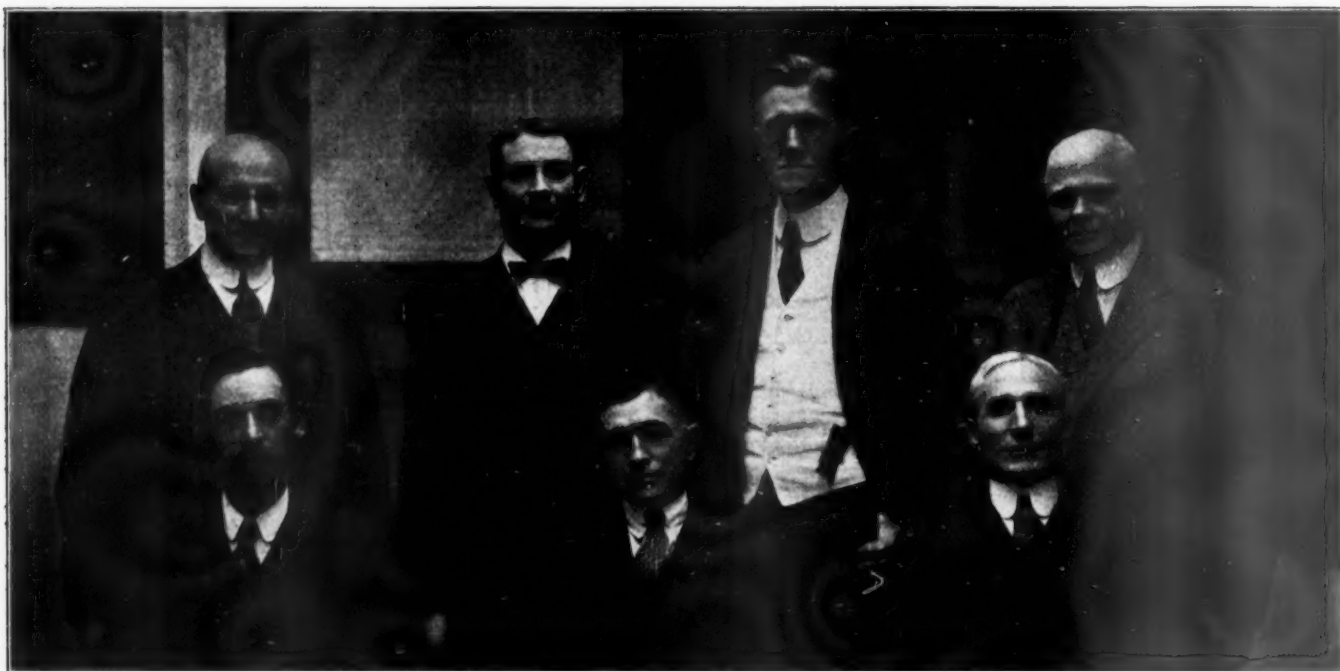
was to be expected under such circumstances, it was not possible to please every one. The effect on the railroad earnings of the loss of traffic caused by the strike and of the extra expenses incurred in dealing with it have not yet been shown by the complete reports. One effect was to scatter again many of the open-top cars which efforts had been made to return to the owning roads in preparation for the relinquishment of federal control.

Numerous changes in the personnel of the Railroad Administration were made early in 1919, chief of which were the appointment of six new directors of divisions, including two new divisions. C. R. Gray and R. S. Lovett resigned in January as directors of the divisions of operation and of capital expenditures, respectively, and were succeeded by W. T. Tyler and T. C. Powell. Max Thelen was appointed director of the new Division of Public Service, succeeding to part of the duties formerly performed by C. A. Prouty, who remained as director of the Division of Accounting, and later in the year Swagar Sherley succeeded John Skelton Williams as director of the Division of Finance, while H. B. Spencer was made director of the new Division of Purchases. E. M. Underwood succeeded John Barton Payne as general counsel. Two of the regional directors also resigned during the year, A. H. Smith and C. H. Markham, and were succeeded by A. T. Hardin and L. W. Baldwin.

A considerable part of the Railroad Administration's central organization at Washington will have to be retained for some time after the relinquishment of its control over operation to wind up its affairs, settle its accounts and adjust disputes with the railroad companies, of which there will be a large number growing out of the contract provisions relating to the upkeep of the properties and to the expenditure for capital improvements. While the operating department will be considerably reduced, it is probable that the accounting and legal departments will have to be increased to take care of the work that will fall upon them. It is understood that Director General Hines will retain his office for some time to direct the readjustment.



The Gare de Lyon in Paris



*Board of Railroad Wages and Working Conditions: Seated, Left to Right, F. F. Gaines, A. O. Wharton, W. E. Morse; Standing, Left to Right, G. H. Sines, J. J. Dermody, C. E. Lindsay, and J. A. Emmart, Secretary.*

## Wage Increases Under Government Control

Payroll Increased by a Billion Dollars, Eight-hour Basic Day  
and Time and One-half for Overtime Granted

**W**HETHER IT BE REGARDED as a development resulting from federal control or merely as one of the past two years, the railroads are being returned to private operation with a payroll about a billion dollars greater than that of the last year of private operation and under circumstances which give promise of little opportunity for any reduction. The principles of the eight-hour basic day and time and one-half for overtime also have become generally established throughout the railroad service. Because the increases in wages have been made by the Railroad Administration, it has become common to refer to the larger payroll costs as having been imposed by the government, although it has become apparent that the higher wage scale has become an almost universal phenomenon and that at least a very large part of the increase would probably have resulted under any form of management.

Moreover, it has recently become more clearly appreciated that the wages allowed by the Railroad Administration have not been substantially more generous than those paid to many other classes of workers, and in fact there are many examples of much larger increases in other lines of industry, notably in the steel industry, than were awarded by the Railroad Administration. While the wages of railroad employees were increased by the Railroad Administration, it is probably more correct to say that they

have been the result of a general governmental policy rather than of any individual policy of the Railroad Administration, because the policy of the government to pay and to encourage high wages in the war industries and the general competition thus created has necessarily affected the wages paid in railroad service.

Regardless of the responsibility for the condition thus created, however, the effect on the railroads is the same and in this connection the manner and method by which the new wage scales have been put into effect are of greater importance than the question of responsibility. It is probably true that if the wage scales for large classes of employees had been continued to be fixed by individual roads or groups of roads the results might have been different from those resulting from the method of dealing with wage scales on a national scale and under a policy of standardization which has produced some extreme results in many cases, but the fact remains that the wages have been made as they have and in such a way that it will be most difficult to readjust them.

**T**WO YEARS of government operation have left the railroads an expensive legacy in the form of wage orders and agreements.

The shorter working day has resulted in an increase of 190,000 in the number of employees in service.

Pay roll cost per ton mile has greatly increased.

The average wage advance since 1915 has been about equal to the increase in the cost of living.

The Esch bill, passed by the House on November 17, contains a provision which was referred to as one for the adjustment of labor disputes in the future, which was frankly accepted as having been proposed by and having the full approval of the railroad labor organizations, which goes so far as to confirm for the future all acts and orders of the



Railroad Administration affecting hours, wages and conditions of employment, but it is manifest that this provision was completely overlooked by a large number of those who voted for it, and there is little prospect that it will be adopted by the Senate.

The fact that railroad wages were dealt with on a national scale, which ran into such large figures as to attract wide publicity, for a long time gave the impression that the employees were being dealt with much more generously than other classes of labor, but recent statistics indicate that this is not the case as far as organized labor is concerned and that the average increase in railroad wages since 1915 has closely approximated the increased cost of living during that time, about 73 per cent.

### Eight-Hour Day Requires Increased

#### Number of Employees

There has been another prevalent fallacy regarding the increase in the number of railway employees which has led some usually well-informed persons to discuss the situation as if they thought that the railroads were taking on so many men that they were standing in each other's way. This view was emphasized by the fact that the disclosure of the increase in the number of railroad employees followed only a short time after the issuance of publicity by Director General McAdoo, which gave the impression that the railroads were greatly handicapped by the shortage of labor and that the results being attained were being attained only by a great increase in the efficiency of labor. As nearly every one in touch with railroad affairs recognized that labor was becoming less efficient instead of more so, it was easy to believe that the increase in the number of employees was unnecessary, but as more detailed statistics have become available it is seen that while more employees are now used for a similar amount of work, the increase in employees has resulted largely from the necessary effect of the introduction of the eight-hour day, and while the number increased from December 17 to July 19 by 11.2 per cent, the number of hours worked was actually 3.9 per cent less, and the total compensation increased 36 per cent.

Of course, the eight-hour day was allowed by the Railroad Administration to large classes of railway employees who had not formerly enjoyed it, but it was not responsible for the introduction of the principle in railroad service. The eight-hour basic day was granted to the train service employees by the Adamson law at the insistence of President Wilson in 1916 as a means of averting a threatened strike, and an eight-hour day was granted the shop employees in the southeast by arbitration in 1917, but the Railroad Administration has extended it gradually to practically all classes of railroad service and has strengthened it by accepting the principle of time and one-half for overtime, which now applies to all classes, although not to the extent demanded by the labor organizations. Both the eight-hour day and time and one-half for overtime were being very generally adopted in other classes of employment during the war, particularly those engaged in production for the government.

### Effect on Pay Roll

It is difficult or even impossible to calculate the exact effect on the payroll of the increases in wages made during the control of the railroads by the Railroad Administration because the amount of the wages depends so greatly on the volume of traffic, the number of men employed and the number of hours they work, and all of these factors, as well as the wage scales themselves, have been changed before the expiration of a full year. Director General Hines, in testifying before the House appropriations committee in June, estimated that on the assumption that the business of 1919 and the number of hours of work would correspond to those

of 1917 the increase in wages over those in effect in December, 1917, would amount to \$852,000,000. During the spring of 1919 additional increases estimated at \$67,500,000 a year for the train employees and others were allowed; in August the shop employees were given additional increases estimated at about \$48,000,000 a year, and Mr. Hines' recent proposal to allow time and one-half for overtime in freight train service is estimated at \$36,000,000 a year.

These figures alone would produce an annual increase of approximately one billion, but with a heavier business than that of 1917 the amount would undoubtedly be increased. For the first part of this year the business was substantially below that of 1917, but since September 1 it has exceeded it and most of the available wage figures are for the first half of the year. While additional increases have been made in 1919, the effect of the previous increases has been lessened by the reduction in the volume of traffic and by the campaign to reduce expenses, which has resulted in a reduction of the number of hours worked by many classes of employees.

### Average Wage Increase 56 Per Cent

Based on comparisons between December, 1917, and July, 1919, Director General Hines reported to the Senate on November 14 that the average percentage of increase in the unit of compensation for all railroad employees was 53 per cent, which would be increased to approximately 56 per cent by including the shopmen's increase not yet reflected in the figures, but that because of the reduction in hours the average increase in monthly compensation was 32.9 per cent, or 35.3 per cent, taking into consideration the shopmen's increase. The wages in December, 1917, were, however, on a higher basis than the average for that year because of the large number of increases made by the railroads during their last year of private management, and the increase for July, 1919, over the average for 1917 was given by Mr. Hines as 45.3 per cent. The average for July, 1919, was \$121.50 as compared with \$89.83 in December, 1917, and \$83.64 in the calendar year 1917. A \$32 increase per month for 1,894,000 employees would amount to only about \$720,000,000 a year.

The following table shows the fluctuations of the total railroad payroll by months since January, 1917. The figures were compiled by the Railroad Administration, but there is a slight discrepancy in the comparisons because the figures for 1917 are for the Class I roads while those for the later years are for the Class I roads under federal operation, and about \$4,000,000 a month should be added to the figures for May, June and July, 1919, for the back pay to the shop employees:

1917	1918	1919
\$128,000,000	\$165,000,000	\$230,000,000
121,000,000	157,000,000	204,000,000
133,000,000	169,000,000	211,000,000
137,000,000	166,000,000	207,000,000
144,000,000	172,000,000	218,000,000
145,000,000	258,000,000	215,000,000
145,000,000	228,000,000	226,000,000
152,000,000	252,000,000	.....
146,000,000	261,000,000	.....
154,000,000	264,000,000	.....
153,000,000	247,000,000	.....
156,000,000	246,000,000	.....
Total...1,718,000,000	\$2,593,000,000	\$1,511,000,000

It will be noted that the average monthly payroll in 1917 was about \$143,000,000, while in 1918 it was about \$216,000,000, which is approximately the average for the seven months of 1919. The early months of 1919 are, however, those in which the business was lighter than in 1918, while by October the traffic had exceeded that of 1918. The figures for 1919 and 1918 are not comparable by months because most of the wage advances made last year were retroactive and amounts chargeable to the earlier number accumulated in the later months.

The increases in wages made by the Railroad Administra-

tion during the period of federal control have undoubtedly far exceeded the original expectations of any of those who had anything to do with fixing them. Originally intended to offset the increases in the cost of living which resulted from the conditions created by the war, the manner in which they were made and the increases being made in other lines of industry necessitated further readjustments in an upward direction, but at the same time the increases that were being made to labor generally undoubtedly had a large part in causing further increases in the cost of living, so that the final results in general can hardly be called disproportionate to the increased cost of living.

Railroad employees have recently been demanding further increases to keep pace with the cost of living on the ground that they have not had enough for that purpose, but their arguments are usually based on the increase in wages during the past two years as compared with an increase in the cost of living since 1913 or 1914.

Director General Hines stated in August that the pay of many subdivisions of classes of railroad employees had been so advanced as to be ahead of the highest point yet reached in the general average increase in the cost of living.

#### Effect of Wage Increases in 1918

The effect of the wage increases in 1918 is strikingly illustrated in a table published in the annual report of the Interstate Commerce Commission, which shows that the compensation paid to employees in 1918 was 65.62 per cent of total operating expenses, whereas from 1908 to 1917 it had fluctuated from 59.48 to 62.11 per cent. The compensation paid to employees per ton mile (including passenger miles reduced to a ton-mile basis) was 4.932 mills in 1918, whereas the highest point it had previously reached was 3.499 in 1914. The operating expenses per ton mile averaged 7.516 mills in 1918 as compared with 5.516 in 1917. The table follows:

RELATION OF LABOR COMPENSATION TO TOTAL OPERATING EXPENSES AND TO TRAFFIC, 1908-1918

Year ended	Railway operating expenses	Operating expenses per ton-mile <sup>2</sup>	Compensation paid to employees <sup>2</sup>		
			Total	Per cent of operating expenses	Per ton-mile <sup>3</sup>
June 30, 1908..	\$1,710,401,791	5.596	\$1,035,437,528	60.54	3.388
1909..	1,650,034,204	5.390	988,323,694	59.90	3.228
1910..	1,881,879,118	5.346	1,143,725,306	60.78	3.249
1911..	1,976,331,864	5.593	1,208,466,470	61.15	3.420
1912..	2,035,057,529	5.599	1,252,347,697	61.54	3.445
1913..	2,249,277,937	5.544	1,381,334,368	61.41	3.404
1914..	2,279,408,486	5.775	1,381,117,292	60.59	3.499
1915..	2,088,682,956	5.576	1,242,319,254	59.48	3.317
1916..	2,277,202,278	5.101	1,403,968,437	61.65	3.145
Dec. 31, 1916..	2,426,250,521	5.142	1,506,960,995	62.11	3.194
1917..	2,906,283,165	5.605	1,783,214,071	61.36	3.439
Dec. 31, 1917..	2,829,325,124	5.516	1,739,482,142	61.48	3.391
1918..	3,971,810,155	7.516	2,606,284,245	65.62	4.932

<sup>1</sup> Including passenger-miles reduced to a ton-mile basis. Mail and express traffic not included in ton-miles.

<sup>2</sup> The compensation is the total pay roll as reported. The proportions chargeable to operating expenses and to capital account, respectively, can not be distinguished.

<sup>3</sup> Class I roads only.

<sup>4</sup> Excludes expenses of companies whose properties are under Federal control.

<sup>5</sup> Excludes compensation of corporate organizations whose properties are under Federal control.

#### Eight-Hour Day and Time and One-Half for Overtime

While the Railroad Wage Commission was strongly disposed to a standard day, in so far as the nature of the service would permit it, its judgment was that the existing hours of service should be maintained for the period of the war and that the existing rules and conditions of payment should not be disturbed. In issuing General Order No. 27, however, Director General McAdoo said he was convinced that no further inquiry was needed to demonstrate that the principle of the basic eight-hour day is reasonable and that "all further contentions about it should be set at rest by a recognition of that principle" as a part of his decision. Recognition "of the principle of the eight-hour basic day in railroad

service" was therefore made in the order, but the question as to what further steps could and ought to be taken to strengthen the application of that principle was referred to the Board of Railroad Wages and Working Conditions.

The train service employees had already been given the eight-hour basic day by the Adamson law, so the increases in wages awarded them by General Order No. 27 were net increases, but as to the employees whose basic day had previously been more than eight hours, the increased compensation established by the order was applied to the number of hours which had theretofore constituted the actual day's work. Where the actual day's work had been 10 hours, the new compensation covered the eight basic hours and two hours overtime and any additional overtime was to be paid pro-rata.

Under this order any reduction in the actual hours worked would tend to reduce the amount of the increase in pay, and, while the provisions of General Order No. 27 were later suspended by supplemental orders which gradually applied the principle of time and one-half for overtime, the effect was shown in the fact that while the increase in the unit rates of compensation in July, 1919, as compared with December, 1917, was 56 per cent, the average increase in the monthly earnings of the employees was only 36 per cent. While there was an increase of about 190,000 or 11 per cent in the number of employees, the number of hours worked was a decrease of 3.9 per cent. This condition will undoubtedly be changed to some extent, however, as the later supplements allowing time and one-half for overtime become effective. And the fact that the men did not receive the full amount of the increases allowed them by reason of the fact that they worked less hours than formerly has undoubtedly been one of the reasons for their dissatisfaction and their repeated demands for further increases.

In presenting their demands for an eight-hour day the organizations usually stipulated that they be given the former 10 or 11 hours' pay for eight hours' work, and while the general increases awarded them as an offset against the increasing cost of living may have given them the impression that they were getting what they asked, the later reductions in hours that were made when business fell off after the armistice presented the case in a different light.

The fluctuations in the total number of railway employees have been as follows:

October, 1917.....	1,733,115	March, 1919.....	1,823,220
December, 1917.....	1,703,748	April, 1919.....	1,830,093
October, 1918.....	1,855,911	May, 1919.....	1,864,561
January, 1919.....	1,848,774	June, 1919.....	1,863,741
February, 1919.....	1,840,197	July, 1919.....	1,894,287

While there has been a large increase in the number of employees, as a whole there have been considerable decreases in some classes, particularly in the train service employees. The largest increase shown is in the number of section men.

The following table, compiled from figures included in Director General Hines' report to the Senate, shows the increases or decreases in the number of employees by classes in July, 1919, as compared with December, 1917, and also the increase or decrease in the average hours worked per employee.

#### Wages and Earnings in July, 1919

Very elaborate statistics showing the wages, hours of employment, and daily, hourly and monthly earnings of railroad employees during the first seven months of 1919 as compared with December, 1917, and the calendar year 1917 were furnished to the Senate on November 14 by Director General Hines in response to a Senate resolution. These statistics were published in the delayed issue of the *Railway Age* for November 7 (published December 8, 1919). They show that the full effect of the increases in rates of pay had not been felt in the average monthly earnings, at least for the month of July, because of the reduction in hours



of work, but the effect in a month of heavier traffic might be different.

### National Agreements

Another development of the labor policy of the Railroad Administration has been the execution of national agree-

of many of the minor organizations and the policy of the administration has been to deal with the employees through their organizations almost exclusively. This has led to a very rapid increase in the membership of some of the organizations that formerly had very little strength and to their amalgamation in some instances, and the signing of the

NUMBER OF EMPLOYEES AND AVERAGE HOURS WORKED  
Class I Roads Under Federal Control December, 1917, and July, 1919

Class of Employee	Number of employees December, 1917	July, 1919	Increase or Decrease	Average hours worked per employee		Decrease or Increase
				July, 1919	December, 1917	
General officers	7,432	7,432	—20	days 27.7	days 27.9	....
Division officers	11,136	12,511	1,375	days 29.4	days 30.6	days 1.2
Clerks (except No. 37)	195,097	216,764	21,667	213	230	(—)7.
Messengers and attendants	8,810	10,122	1,312	days 28.1	days 27.5	inc. .6
Assistant engineers and draftsmen	10,810	10,370	—440	days 26.6	days 26.7	—1
M. W. & S. foremen (excluding Nos. 10 and 28)	7,786	8,119	333	days 27.2	days 29.1	1.9
Section foremen	39,443	40,899	1,456	days 28.2	days 28.9	.7
General foremen, M. E. department	1,665	1,707	42	days 29.9	days 27.1	inc. 2.8
Gang and other foremen, M. E. department	18,429	23,592	5,163	days 28.4	days 28.9	.5
Machinists	42,973	59,067	16,094	206	248	42.
Boiler makers	13,469	18,413	4,944	213	253	40.
Blacksmiths	8,369	9,898	1,529	200	224	24.
Masons and bricklayers	1,330	1,186	—144	202	223	21.
Structural ironworkers	852	673	—179	201	226	25.
Carpenters	50,848	50,854	6	201	234	33.
Painters and upholsterers	9,878	12,632	2,754	194	225	31.
Electricians	9,894	13,200	3,306	days 26.8	days 29.0	2.2
Air-brake men	5,846	7,781	1,935	217	280	63.
Car inspectors	20,763	24,258	3,495	239	328	89.
Car repairers	66,443	80,417	13,974	209	240	31.
Other skilled laborers	55,201	56,307	1,106	213	254	41.
Mechanics' helpers and apprentices	92,018	107,263	15,245	208	251	43.
Section men	212,663	286,300	73,637	207	251	44.
Other unskilled laborers	104,050	118,932	14,882	215	260	45.
Foremen of construction gangs and work trains	2,239	1,910	—329	228	316	88.
Other men in construction gangs and work trains	28,651	30,306	1,655	206	248	42.
Traveling agents and solicitors	5,245	1,355	—3,890	days 25.8	days 28.5	2.7
Employees in outside agencies	1,342	927	—415	days 27.8	days 32.5	4.7
Other traffic employees	510	426	—84	days 27.0	days 24.8	inc. 2.2
Train dispatchers and directors	5,158	5,413	255	242	258	16.
Telegraphers, telephoners and block operators	20,975	20,859	—116	234	245	11.
Telegraphers and telephone operating interlockers	7,588	8,243	655	232	252	20.
Levermen (non-telegraphers)	3,513	3,926	413	240	283	43.
Telegraph clerks	11,178	11,362	184	237	273	36.
Agent telegraphers	19,149	19,065	—84	244	305	61.
Station agents (non-telegraphers)	14,411	13,898	—513	days 29.5	days 31.4	1.9
Station masters and assistants	614	605	—9	days 30.3	days 31.8	1.5
Station service employees (except Nos. 5, 6, 37, 38, 39, 40 and 66)	110,647	115,255	4,608	223	273	50.
Yardmasters	3,835	3,905	70	days 30.3	days 32.4	2.1
Yardmasters' assistants (not yard clerks)	3,080	3,122	42	days 29.7	days 30.4	.7
Yard engineers and motormen	20,355	19,153	—1,202	237	275	38.
Yard firemen and helpers	20,821	19,559	—1,262	231	271	40.
Yard conductors (or foremen)	20,362	18,785	—1,577	235	269	34.
Yard brakemen (switchmen or helpers)	50,874	47,815	—3,059	224	258	34.
Yard switch tenders	4,841	6,129	1,288	239	317	78.
Other yard employees	3,663	4,705	1,042	243	322	79.
Hostlers	8,493	10,687	2,194	240	337	97.
Enginehouse men	60,439	68,685	8,246	250	318	68.
Road freight engineers and motormen	32,923	30,405	—2,518	242	269	27.
Road freight firemen and helpers	35,549	31,608	—3,941	233	250	17.
Road freight conductors	26,320	24,501	—1,819	256	287	31.
Road freight brakemen and flagmen	65,242	60,525	—4,717	250	276	26.
Road passenger engineers and motormen	12,826	12,761	—65	220	224	4.
Road passenger firemen and helpers	12,433	12,413	—20	216	223	7.
Road passenger conductors	10,607	10,649	42	235	232	inc. 3.
Road passenger baggagemen	5,532	5,669	137	240	245	5.
Road passenger brakemen and flagmen	14,362	15,636	1,274	227	234	7.
Other road train employees	3,697	3,415	—282	239	241	2.
Crossing flagmen and gatemen	15,569	23,069	7,500	days 30.3	days 30.5	2.
Drawbridge operators	1,267	1,669	402	days 31.0	days 33.0	2.
Floating equipment employees	8,243	9,288	1,045	265	305	40.
Express service employees	12,275	11,541	—734	days 30.2	days 31.7	1.5
Policemen and watchmen	5,492	5,470	—22	days 25.5	days 32.0	6.5
Other transportation employees	18,203	20,876	2,673	days 28.2	days 29.3	1.1
Totals	1,703,748	1,894,287	190,539			

This report is compiled according to the classification prescribed by the Interstate Commerce Commission in accordance with the Act to regulate commerce, which classification has been the prescribed form since July 1, 1915.

The Interstate Commerce Commission classification sub-divides items 1 and 2, General Officers, and items 3 and 4, Division Officers, as between those receiving over and under \$3,000 per annum, and sub-divide items 5 and 6, Clerks, as between those receiving over and under \$900 per annum. As the sub-division of these classes on such a basis is purely arbitrary, and has no relation to the class of work performed, the sub-divisions are omitted on these reports.

The classification of employees prescribed by the Interstate Commerce Commission and used in the reports, does not correspond with the classification of employees used in the wage orders of the Railroad Administration, with the result that employees in a given class (of wage orders) receiving either higher or lower wages may be included with the employees of another class (of the Interstate Commerce Commission classification.)

A comparison of the number of employees in January, 1919, and December, 1917, is misleading, because in December, 1917, on account of the extreme cold weather, much outside work had of necessity to be suspended. In addition, there was a scarcity of labor, in consequence of the competition of war industries, and the generally higher wages paid by them which had attracted many employees from railroads.

On the contrary, the weather was exceptionally mild in January, 1919, and permitted the prosecution of an unusual amount of outdoor work; moreover, the labor supply was relatively greater because of higher wages, and in consequence of the cessation of war activities. In addition, the Railroad Administration had not yet been able fully to reduce its forces from what had been necessary to handle the peak load which was reached about the time of the signing of the armistice a couple of months earlier.

In considering the number of employees in view of the changes in the working conditions between 1917 and 1919, the number of hours worked should be carefully noted.

ments covering rules and working conditions, with the shop craft unions and the organizations representing the maintenance of way employees. The general order issued by Mr. McAdoo early in 1918 forbidding any discrimination against labor organizations tended to encourage the growth

national agreements with organizations which some roads had formerly refused to recognize will naturally have a tendency to perpetuate their strength, particularly as the agreements contain many provisions which most railroads had formerly refused to acquiesce in.

The agreement with the shop craft organizations represented by the Railway Employees' Department of the American Federation of Labor signed on September 20 contains 56 typewritten pages of rules and conditions, while a similar agreement with the maintenance of way employees signed on November 22 contains 12 pages. These agreements had been under consideration since the first part of the year, when they were proposed by the labor organizations. They were first worked out by committees representing the organizations and then submitted to the Board of Railroad Wages and Working Conditions which made recommendations to the director general and further modifications were made after negotiations between the director general and his staff and representatives of the union. Other agreements for other classes of employees also have been under consideration by the administration.

### Strikes

There was a time when advocates of government ownership of railroads used to employ as one of their favorite arguments the assertion that government operation would prevent strikes. Railroad strikes on government owned lines in all parts of the world had become so common before our government took over the railroads as a war measure that the argument had lost most of its force, but as it is occasionally still used, for future application it may be well to note here that government operation of the railroads has not been entirely free from strikes, although the taking over of the roads in December, 1917, put a stop to some very serious threats of a general railroad strike.

There were several local strikes of shop employees in 1918, and in 1919 there have been a strike of clerks on the Nashville, Chattanooga & St. Louis during the early part of the year, some widespread strikes of shop employees which seriously interfered both with operation and the repair of equipment in August, a sympathetic strike of train employees on the Pacific Coast, and a strike of the express employees in New York City.

All of these strikes have been without the authority of the national organizations of the employees involved, and in most cases they were rather speedily terminated, with the assistance of the national officers, after the director general had delivered an ultimatum that after a certain time the striking employees would be regarded as having terminated their employment unless they returned to work. The director general has invariably refused to deal with the strikers until after their return to work. In general, however, the comparative freedom from strikes has been purchased by rather expensive concessions.

### Labor Still Dissatisfied

After all that has been done for labor by the Railroad Administration both in the way of increased wages and in the direction of improved working conditions, the labor organizations have not been satisfied and at least in their public statements and in statements at hearings before the wage board have frequently been very bitter in their criticisms of the Railroad Administration on the ground of alleged discrimination between classes. So many revolutionary changes in wage schedules worked out in so short a time have naturally left many occasions for controversy on the questions of relationship between various classes of employees. As is frequently the case, however, the labor leaders have used a very different tone in utterances intended for public consumption and in their direct negotiations with officers of the Railroad Administration and while they have besieged with their demands the officers of the Division of Labor and of the Division of Operation that have handled the details of the negotiations with the director general following the submission of recommendations by the wage board, it is understood that their attitude has been much less belligerent dur-

ing these negotiations than in their published statements, even at times when their demands were being refused, as many of them have been.

The fact that the Railroad Administration has been able in some way to provide the necessary funds to meet the demands of labor has naturally led to more friendly relations than those that prevailed between the railroad officers and the labor executives at a time when the railroads had to resist all demands upon them because they could not know until after a long proceeding before the Interstate Commerce Commission whether it would be possible to earn revenues sufficient to pay increased wages. The demands of labor have long since exceeded any possibility of meeting them out of the share of railway income devoted to capital and the increases allowed them in 1918 exceeded the greatest amount ever paid in interest and dividends in any year. The result has undoubtedly been, however, that the improvement in the relation between labor and the central organization of the Railroad Administration has been to some extent at the expense of the relations with the local officers of the individual roads because labor has naturally looked to Washington and has less respect for the local officers.

In spite of their criticisms of the Railroad Administration, the labor organizations have almost unanimously declared for a continuation of government control and since their Plumb plan encountered so much opposition the work of their lobby in Washington and of their representatives in Congress has been largely concentrated on efforts to prevent the return of the railroads and to bring about a two-year extension of federal control.

This policy adopted by labor has undoubtedly been dictated by the fact that the government has been able to pay wages greater than the traffic would bear and make up the deficit from appropriations but has also been inspired to some extent by the fear that private management would endeavor to reduce the wages allowed by the government, as indicated by the provision in the Anderson amendment to the Esch bill designed to guard against just such a contingency.

Moreover, if the labor leaders really take their Plumb plan seriously and are not merely using it as a vehicle for their propaganda against a return to corporate management, a continuation of the present system of control might leave them in a better strategic position during the next election campaign.

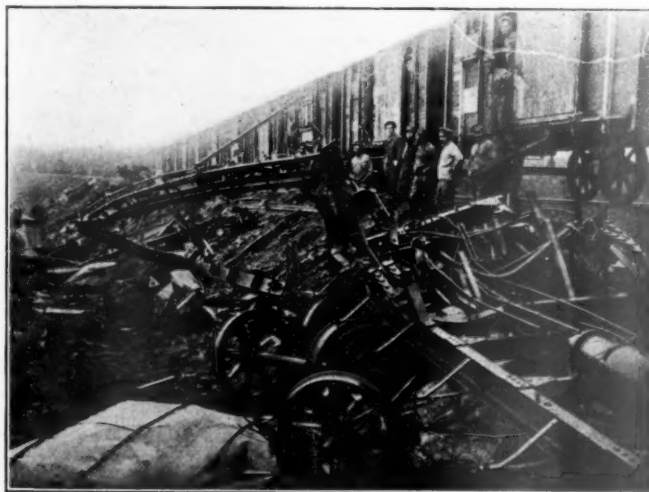


Photo from International

**Russia Will Be a Good Market for Railway Cars if It Ever Gets Back to Normal**





Consolidated Ticket Office.

## Traffic Field Changes Present Unsolved Problem

Retention of New Methods for Handling Freight and Passengers Requires Extensive Consideration

OF ALL THE VARIOUS DEPARTMENTS of railway operation it is probably true that none underwent such radical changes during the past two years as the traffic department. The transition from private to governmental control brought about certain of these changes automatically, while others were made as the conditions of unified operation became apparent. Still other changes were consummated later in the interests principally of efficiency and conservation. These departures from earlier practices have not come as the result of the introduction of new ideas by new men in the railroad field, for the men who have developed the practices we now know in the traffic field are the same men who, previous to government control, established and maintained the practices then known. Rather, these changes were brought about through the placing of the railroads in the country under one central administration and the elimination of competitive conditions.

Among the changes which have been made largely because of this conversion are the introduction of consolidated ticket offices, the disregard of routing instructions, the elimination of competitive train service, the discontinuance of off-line agencies and the discontinuance to a large extent of solicitation and advertising for the purpose of capturing traffic. In addition—and because of a com-

bination of causes—there has been introduced an extensive use of the permit system and of embargoes in the handling of freight. Still other changes have taken place which might more aptly be attributed to a desire for increased efficiency

and better service, among which might be mentioned the new methods of handling rates, the introduction of new way bills and the standardizing of many traffic reports.

In addition to the changes already enumerated there have been numerous minor changes in policies and performance in the traffic department. Many of these less important changes are such that their continuance after the return of the roads to private control would be impracticable because of the restoration of competitive conditions. As a matter of fact, it is conceded by both shippers and railroad men that these changes are merely innovations, applicable under government control, and will disappear automatically when the return to private control is made. For this reason only those radical

**T**HE TRAFFIC FIELD has undergone more radical changes during the past two years under government operation than any other field of railway operation.

Many of these changes have come as a result of the elimination of competitive conditions and the centralizing of control.

With a reversion to the competitive conditions of private control impending, the problem is presented of taking advantage of all the real lessons learned under unified operation.

changes in the traffic field which may become permanent, even under the competitive conditions of private control, are considered in this article. Certainly it would be most unfortunate if, after the return is made to private control, we were to fail to retain the advantageous features of the work which has been done by the United States Railroad

Administration in the traffic departments, and which will be of a constructive character under these conditions.

### Consolidated Ticket Offices

Of all the changes made in the traffic field during the past two years, none has been as apparent to the general public, or more radical, than the consolidation of the many separate city or uptown ticket offices in the larger cities. Prior to government control it was customary for the various railroads to maintain small and often elaborately outfitted city ticket offices at points easily accessible to the traveling public. Soon after the lines were taken over by the government Director General William G. McAdoo issued orders discontinuing these separate city freight and passenger offices where the public could be served as conveniently at the depots, and consolidated ticket offices in the larger cities. This consolidation was first put into effect at Washington, D. C., and at Atlanta, Ga. Insofar as public service under government control and operation was concerned, the consolidated offices were regarded as successful, and the plan was soon extended to practically all of the larger cities, until the United States Railroad Administration is now operating 111 consolidated ticket offices in cities where, prior to government control, 563 separate offices were maintained.

The first reaction of the traveling public toward this change seemed to be, on the whole, one of approval. The new offices were, in the majority of cases, conveniently situated and, having adequate representation of all of the lines under federal control, proved to be a valuable aid both to those travelers who are familiar with our transportation system and to those who were not accustomed to traveling and who needed assistance in planning their journey. However, students of railway economies early saw many defects in the consolidated ticket office plan. As a temporary measure the closing the large number of separate ticket offices was in itself a considerable expense, as many of the railroads held long-term leases upon their quarters and had gone to considerable expense in making these offices attractive. In addition, there was the large expense of obtaining new and more commodious quarters for the consolidated offices and of providing adequate new fixtures. No figures are available concerning the relative cost of establishing and maintaining these offices as compared with that for the larger number of smaller offices maintained prior to government control, but it is believed that their establishment has resulted in added expense, rather than in reducing the expenditures which would have been necessary for the maintenance of the offices already established. This assumption, of course, is based on consideration of the consolidated ticket office as a temporary innovation.

As the offices continued to operate certain fundamental defects in the consolidated ticket office idea began to appear. From the standpoint of the success of government control and operation alone, these defects have not been as apparent as they otherwise would be, but, as an instance, it has been found that the operation of these offices has tended to create certain routes of passenger travel, to the detriment of others. To a large extent the elimination of competitive passenger train service has brought about this result, but it must, nevertheless, be considered in any discussion of the advisability of continuing consolidated offices. Closely allied with this defect is the handicap placed upon the less favorably situated railroads in obtaining their usual quota of passenger traffic. The placing of all railroad ticket-selling operations in one office has caused a diversion of traffic from these weaker lines to the stronger lines, so that passenger traffic on many of the weaker competitive roads has been greatly curtailed. One result has been to intensify the crowding of trains on certain lines.

When the return to private control is consummated the

competitive conditions, which will be largely re-established, will make it improbable that the roads which have suffered through curtailment of their passenger traffic will be willing to continue to share a consolidated ticket office. The smaller and less favorably located roads will be forced to again actively solicit passenger traffic, as will the roads which have suffered because of the establishment of certain preferred routes. The result may be the gradual disintegration of the consolidated ticket offices and the re-establishment of the separate city or uptown offices.

### Off-Line Agencies

On account of the keen competition for both passenger and freight traffic prior to government control and operation, separate off-line offices maintained by various transportation interests were well known and established institutions. These offices not only served as headquarters for soliciting agents, who were placed in practically all of the commercial centers of the country, but also as agencies of information where shippers could secure quotations of foreign and domestic rates and where certain functions were performed, such as the filing of passing reports on carload shipments, thereby facilitating the tracing of delayed cars, supervision over package car service, tracing of delayed merchandise, adjustment of claims, reconsignment of carload freight and the diversion of delayed or embargoed freight to connections. As in the case of the separate uptown ticket offices, these off-line agencies were discontinued soon after the inauguration of governmental control.

Unlike the change in regard to the city ticket offices, however, this move did not meet with the approval either of railroad men or shippers, and the shipping public immediately protested against the discontinuance of the services previously rendered by these agencies. Railway men on foreign lines saw in the move the diversion of much of their freight traffic through failure to have adequate representation at shipping sources. In as far as the traveling public is concerned, the Railroad Administration took the position that the services formerly performed by the off-line agencies could be performed as readily by the consolidated ticket offices in the various cities. To a certain extent, this position was well founded, but under this plan a foreign line is only nominally represented, and it therefore could not give the prospective passenger the service that he desired or was accustomed to.

With reference to freight traffic, it was found that the elimination of the services formerly performed by the off-line agencies meant the taking away of a real service to the shipping public and one which could not be performed by any other agency. That this fact was forcibly brought to the attention of officers of the Railroad Administration is disclosed by the fact that Director General McAdoo, in presenting a statement to the Interstate Commerce Committee of the United States Senate in January, 1919, stated that "It was found, however, that in some measure these agencies had performed real service to the public, and therefore the establishment of public service freight bureaus has been begun with a force trained to handle for shippers matters which were formerly handled by the off-line agencies." The move outlined in Director General McAdoo's statement has never been entirely carried out, and nothing so far has been produced by the Railroad Administration to fill adequately the place formerly filled by the off-line agencies.

It is now the general opinion of railroad men and shippers that the re-establishment of off-line agencies is necessary to the success of many lines, and that with the return to competitive conditions under private control these agencies will be re-established, at least in so far as the handling of freight traffic is concerned. It is also agreed that the abolition of the services performed by these off-line agencies has



been detrimental to both the carriers and to the shippers. Whether passenger representation will also be re-established depends to a large extent upon whether or not the consolidated ticket offices are retained. One proposal is that the off-line agencies shall be restored only in the larger centers of population and industry and that they shall take only upstairs offices. But competition will be the principal influence in settling what will be done.

#### Elimination of Competitive Passenger Train Service

During the first year and a half of government control, and especially during the first few months of it, the movement of troops and their equipment required the release of passenger train equipment wherever this could be accomplished without serious handicap to the traveling public. In addition, the enormous amount of freight to be moved demanded a curtailment of passenger service. The logical move was to reduce to a minimum that traffic which was least essential and most detrimental to expedited freight movements.

Accordingly one of the first moves of Director General McAdoo, upon his appointment as head of the nation's transportation system, was to initiate a thorough study into the passenger train requirements of the civilian population and eliminate competitive train service wherever possible. It was found, for instance, that the passenger train service between Chicago and St. Louis, Mo., could be reduced from 15 trains daily to 9 and still give adequate service between these points. Similarly duplicated service has been rendered for many years between many large terminals throughout the country, all of which was reduced in like manner. As a matter of fact, the traveling public in many cases was given better service, because the schedules of the passenger trains remaining were rearranged in such a manner that service between the two points was furnished oftener. With these curtailments there was also introduced the use of joint tickets good over any of the federal controlled lines between large terminals, thus giving the passenger an additional advantage over the former system.

Of all of the methods introduced in the handling of traffic it is generally conceded that this one can best be retained after the return to private control is made. It was to the detriment rather than to the benefit of our transportation system as a whole that competition had led to the development of extravagant duplication of service, so that two, three or even four trains left a point of origin at the same time for the same destination over different lines. However, responsibility for this condition cannot be placed entirely upon the competing railroads, for they were prevented in the past by the stringent laws from making any agreements for the division of passenger traffic or regarding the rendering of service. Whether or not there will be a reversion to this duplication of service by the competing railroads is a question which depends largely upon the latitude granted the companies in the railroad legislation to be passed by Congress. If the railroads are given the right to pool traffic much of this duplication can be avoided and the spacing of passenger trains can be developed.

#### Disregard of Routing Instructions

Similar to the changes already enumerated, the subject of the rerouting of traffic was brought forward immediately after government control became a war measure. At that time the freight traffic of the country had reached a state of acute congestion because of the enormous increase in the total traffic and because of the enormous quantities of war materials and foodstuffs which had to be moved quickly. Stringent measures were needed immediately to relieve the situation. It was found that a considerable amount of freight was moving by routes which intensified the conges-

tion at certain points and that other freight was moving by circuitous routes due to the competitive conditions which had prevailed up to this time. The Railroad Administration decided to move war materials and freight traffic generally over more direct or less congested routes. In general this plan was adopted, and from that time to the present traffic has been diverted from its normal channels to those routes which are shorter or which avoided congested districts.

From the beginning shippers' instructions have been disregarded in so far as they have conflicted with what has been considered the best way, from a railroad standpoint, to move the traffic, and, although the results have not been entirely satisfactory to the shippers, much congestion has been eliminated and in many cases commodities have been moved more expeditiously. It is hardly to be expected that with the return of competitive conditions this entire disregard of shippers' instructions can be continued as the usual procedure. It is possible, however, that some arrangement may be made whereby disregard of shippers' instructions can obtain in times of stress to alleviate congestion. This determination of the matter, like many others incident to the change from governmental to private control, will depend partly on the legislation which will be passed by Congress. Provision may be made in this legislation for the vesting of power in the Interstate Commerce Commission or some other body to authorize disregard of shippers' instructions and the moving of freight by the best available route when the necessity arises. It is certain that, in-so-far as the general public is concerned, the vesting of this power in some central body will work to the ultimate benefit of all concerned and that the carriers will better serve the interests of the country in times of necessity if such action is taken.

#### Permit System and Embargoes

The extensive use of the permit system and of embargoes was a natural consequence of the enormous increase in traffic, and the resulting congestion at many of the railroad terminals at the time government control was adopted. The conditions called for drastic action of some kind, and it was found necessary to place embargoes immediately upon certain routes and terminals until the congestion could be relieved. Later it was found that the placing of embargoes did not entirely accomplish its purpose, and it was found necessary to install the permit system whereby the forwarding of freight to embargoed terminals and ports could be controlled at its source, thus relieving the stringencies of general embargoes and distributing the hardship attendant upon congested terminals.

It is generally conceded that the placing of embargoes and the installation of the permit system were necessities, and therefore no vigorous opposition has been developed. While the permit system has been practically suspended in-so-far as domestic traffic is concerned, it has remained effective as to export shipments and has recently been reinstated to assist in the movement of the enormous grain crop.

Like the disregard of shippers' routing instructions, these methods may be retained profitably as permanent features, for in times when congestion seems imminent it would be advisable to have such methods available and under the jurisdiction of some responsible body, by means of which the difficulties can be successfully avoided or overcome.

#### Advertising and Solicitation

The changes which have taken place in respect to the influencing and development of traffic by means of advertising and of active solicitation are intimately associated with the other innovations which have already been enumerated. Soon after the adoption of unified control as a war-time measure orders were issued by Director General McAdoo discontinuing all advertising and all solicitation, except the

agricultural development work which had long been carried on by the railways and which was intended primarily to develop new traffic.

The order was drastic and the results were far-reaching. Advertising campaigns on which individual railroads had been expending thousands of dollars were stopped immediately, as was the solicitation of traffic, which had come to assume a prominent place in transportation activities. The reason for such drastic action under government control was only too apparent. Advertising and the solicitation of traffic are both incidental to active and keen competition, and the elimination of this competition ended the need for activities of this nature. In addition, it was also true that at the time this order was issued the Railroad Administration was forced to recognize that more traffic than could possibly be handled was being offered to the railroads and that any further development work, either passenger or freight, at that time would only result in increasing the congestion which was already acute.

This curtailment of advertising and solicitation continued in effect until comparatively recently, when the Railroad Administration has again taken cognizance of the necessity for developing traffic. Accordingly, national advertising was again resumed by the Railroad Administration soon after the signing of the armistice. At the same time agricultural development work intended for the development of new traffic which had been practically dormant, was revived. At the present time the Railroad Administration is conducting a moderate advertising campaign to promote travel to the national parks and monuments and to populate and develop new areas.

There is no question as to the advisability of resuming both advertising and solicitation after the return to private control is made. Whether in the interests of economy and efficiency or not, competition will necessitate bigger advertising and solicitation campaigns and a resumption of the former means of increasing traffic.

#### Other Changes in the Traffic Field

It is not possible in an article of this length to discuss all of the changes which have taken place in the traffic field during the period of government control and operation, nor is it practicable adequately to discuss even those changes which may be termed major or radical changes. With the return of the roads to private control it is hardly to be expected that many of these changes can be made permanent in view of the probable resumption of competitive activities. However, it would be most unfortunate if the roads should

be returned to private operation without full advantage being taken of such lessons as have been learned from unified control and operation. The inadequacy of railroad facilities of all kinds is now greater than ever before, and therefore the interests of both the railroads and the public demand that competition shall be restricted wherever its unrestricted operation will tend to interfere with rather than promote the more efficient utilization of facilities.

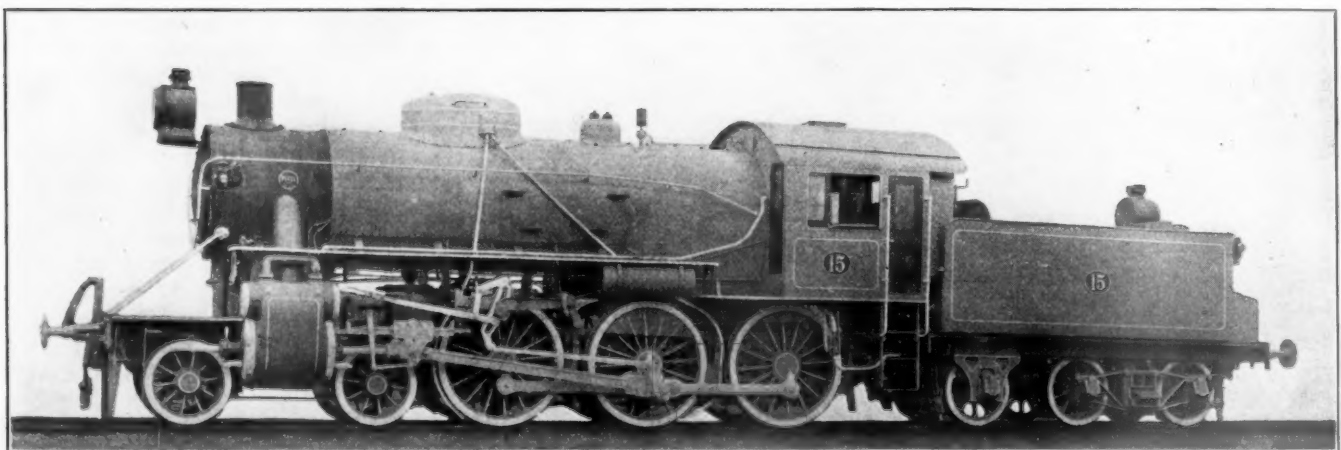
### Grievances, General Order No. 65

IN GENERAL ORDER No. 65, dated December 10, Director General Hines says:

"Grievances affecting employees belonging to classes which are or will be included in national agreements, which have been, or may be, made between the United States Railroad Administration and employees' organizations will be handled as follows:

"(a) Grievances on railroads not having agreements with employees, which grievances occurred prior to the effective date of any national agreement, will be handled by railroad officials in the usual manner with the committees and officials of the organizations affected for final reference to the Director of Labor, as provided in Circular No. 3 of the Division of Labor. Grievances on railroads having agreements with employees, which grievance occurred prior to the effective date of any national agreement, will be handled by railroad officials in the usual manner with the committees and officials of the organizations with which the agreement was made, for final reference to railroad boards of adjustment, as provided in general orders creating such boards. Decisions made as the result of such reference will apply to the period antedating the effective date of such national agreement and, from the effective date of that agreement, will be subject to any changes that are brought about by national agreement.

"(b) Grievances which occurred on the effective date of any national agreement, and subsequent thereto, will be handled by the committees of the organizations signatory to such national agreement for final reference to the appropriate railroad board of adjustment, except on roads where other organizations of employees have an agreement with the management for the same class of employees, in which case grievances will be handled under that agreement by the committees of the organization which holds the agreement for final reference to the Director of Labor, as provided in Circular No. 3 of the Division of Labor."



**Ten-wheel Locomotive Built by the Baldwin Locomotive Works for the Norwegian Trunk Railroad.**

This locomotive has 22.05 in. by 23.62 in. cylinders, a total weight in working order, engine only, of 128,800 lb., a weight on driving wheels of 107,000 lb. It is built for passenger service and will burn hard coal.





## Unified Terminals Result in Increased Efficiency

Co-ordination Under Government Control Decreases Congestion and Improves Service

**T**HE EXTENSIVE WORK done by the United States Railroad Administration in co-ordinating the operation of terminals has resulted in the saving of much money and considerable time, as well as in increasing the efficiency of terminal work. The co-ordination of terminals has been a prolific source of discussion for years, and when the government assumed control it was confidently expected by the public that the ideal would be exemplified immediately with stirring results. It was believed that an "Ebenezer" would be set up which would effect savings amounting to millions and would cause congestion and delay to vanish. Time has shown that congestion and delay did become appreciably less and that savings have been made, which, while perhaps not so great as expected, were considerable.

One of the weak links in the chain of American preparedness has been an insufficiency of terminal facilities, notably in the East. The great transportation lesson learned through the experience of the war has been that the railroads have not kept pace in their outlay for rolling stock and terminal facilities with the growing needs of the public, even aside from the war emergency.

The improvements in terminal operation possible through the co-ordination of facilities are best shown by narrating briefly what has been accomplished. Therefore the follow-

ing information is presented by regions, the data being obtained from a report prepared by the Committee on Yards and Terminals of the American Railroad Association and the American Railway Engineering Association with the co-operation of the Railroad Administration:

### Eastern Region

The facilities and forces have been consolidated in the Eastern region at hundreds of small points, where little more than interchange facilities or small engine terminals exist. The unification of terminals has also been brought about in six of the largest cities, Buffalo, N. Y., Cincinnati, Cleveland and Toledo, Ohio, Detroit, Mich., and the New York and Jersey shore terminals at New York City, all or the facilities at each place being brought under the jurisdiction of a terminal manager. The Baltimore & Ohio passenger trains were diverted from the terminal of the Central of New Jersey on the west shore of the Hudson River at Jersey City, into the Pennsylvania terminal on Manhattan Island on May 1, 1918,

while on September 15 of that year certain trains of the Lehigh Valley were also transferred to the same terminal.

The savings in money and time from these various consolidations in this region have not been estimated, but are declared to be large. Where facilities and forces were consolidated changes incidental to the handling of the business

**I**NSUFFICIENT terminal facilities constitute a weak link in the American transportation system. Under government control the consolidation of forces and facilities was greatly expanded.

The outlook for a continuance of unification is not propitious, the consensus of opinion being that it is an excellent idea but impossible of realization following return of roads to private management.

Solving of the problem of inadequate terminal facilities, and of needed coordination of their operation, is imperative.

by one organization instead of two or more were made, which eliminated duplication of work and permitted economies to be effected through the centralizing of particular duties with forces especially qualified to handle them. Among these items were the inspection of equipment at interchange points where the inspection forces were combined; the elimination of separate switching work at industrial plants; the consolidation of the freight houses of two or more roads by concentrating inbound freight at one house and outbound at another, both under one agent, and closing other freight stations, and the use by two or more roads of one road's engine terminals, coaling stations, etc.

No information is available regarding the saving, if any, in equipment resulting from these changes, except that, in a general way, the consolidation of work at yards and terminals has affected a more efficient handling of the business, with the result that shipments are moved in and out of terminals in a shorter time.

Several cases were reported in this region where the consolidation of freight and passenger stations resulted unsatisfactorily. These developed after the signing of the armistice and were largely due to the fact that at such points the public felt that there was no longer a necessity for a continuance of the inconvenience of having to go a considerable distance to a station handling the consolidated business.

#### Allegheny Region

The largest cities in the Allegheny region in which consolidations in terminal operation was effected were Philadelphia, Pa., Baltimore, Md., and the Jersey shore terminals opposite New York City. At these points car repair, roundhouse and switching facilities were co-ordinated and used jointly where practicable and single inspection at interchange points was effected. Carload and l.c.l. freight, including grain, coal, etc., and export freight were diverted freely to avoid accumulation. To accelerate the movement of cars and effect a saving in mileage, short routing was inaugurated wherever practicable and, where necessary to avoid accumulation, cars were diverted from stations of congested lines to those able to handle the traffic. In Baltimore 16 shorter routes were established and 23,150 cars diverted to July 1, 1919, while in Philadelphia 22 shorter routes were established and 12,681 cars diverted in this period. The permit system was in vogue on certain commodities to control the flow of traffic on all lines to those terminals doing heavy business and is still in use, so far as export business is concerned.

Following the armistice the traffic lessened, and on May 1, 1919, the offices of the terminal managers at Philadelphia and Baltimore were abolished, the operations at these terminals at the present time being supervised by the individual roads, while the co-ordinations and unification effected continue in force.

#### Poahontas Region

Because of the few large cities in the Poahontas region unification was not carried out to the extent that it has been in other regions. Except at Norfolk-Hampton Roads there are no large terminals in the region and therefore unified control has not entailed any radical changes in operation, the general benefit of such changes as were made having resulted from the centralization of control and the avoidance of duplication of supervision and service, rather than through any marked departure from the general practices of handling cars.

The unifications at Norfolk, Va., resulted in a reduction in yard, station and shop labor, in clerical forces and in tug service. At 27 smaller cities and towns served by the roads of the region, station, engine house and yard facilities were consolidated in part, with a reported reduction in expense and a material expedition of service.

#### Southern Region

While it was found that complete physical unification of the larger terminals in this region was practically impossible, the co-ordination of facilities was effected to some extent in 49 of the principal terminals and at 90 smaller points. Individual railroads in many cases had outgrown the facilities provided for handling their own business and no one line had a plant with capacity for taking over the entire business of the terminal and handling it as a unit. Consequently consolidation had to be restricted in such instances to the placing of all the units in one terminal under one general head. Terminal managers were appointed at Atlanta, Ga., Birmingham, Ala., Charleston, S. C., Jacksonville, Fla., Louisville, Ky., and New Orleans, La. While in only a few instances in the larger centers was it possible to abandon the use of existing facilities through the consolidation of two or more lines, at smaller points physical unification was possible, and in numerous such instances plants were abandoned and the activities of the lines, large and small, consolidated with regard to the most adequate available facilities, including yards, freight stations, roundhouses, etc. In such cases the additions resulted in more efficient operation with a substantial saving in money, although, because of the necessity of keeping separate accounts for each road, it was necessary to retain larger clerical forces than otherwise would have been necessary, this handicap also applying to the freight houses.

One of the considerable economies obtained in this region was through the consolidated use of equipment in l.e.l. service, resulting in the loading of one car daily to points to which each of the lines involved formerly sent one car every day partially loaded. Wherever roundhouse and mechanical department facilities for one road were found ample for the purpose of unification, similar facilities were discontinued on other roads, their organizations merged and a general yardmaster placed in charge.

#### Unification of Terminals in the West

From December 31, 1917, to June 30, 1918, all the Western lines were under the jurisdiction of a single regional director. The Western region was then divided into the Northwestern, the Central Western and the Southwestern regions. The unification of terminal and station facilities was carried further in the Western region than in any other area and as a result the annual savings were estimated at \$2,769,632. The problems offered by the terminals at Chicago, Minneapolis-St. Paul and other large centers throughout the West brought with their solution changes which effected practically every point in the district.

#### Unification in the Chicago District

When the district was under the jurisdiction of the Western regional director, estimated annual savings were made at the Chicago terminals amounting to \$407,346, and from July 1, 1918, to December 31, 1918, when the Chicago terminals were under the jurisdiction of the Northwestern regional director, estimated savings of \$582,931 were effected, making a total of \$990,277 estimated annual savings resulting from the steps taken toward the unification of terminal and station facilities at that city in the one year. Of this amount, \$310,977 was saved by the abolishment, in April, 1918, of direct interchange facilities and the substituting therefor of the service of the Belt Railway; the establishment of one-line switching and one-line transfer services; the rearrangement of switching service, and the rerouting of interchange business.

The Chicago terminal district embraces approximately 2,500 square miles and extends from Lake Michigan to and including the main line of the Elgin, Joliet & Eastern. It is served by 40 railroads, all but a few of which have been retained under federal control. The number of cars for-



warded by the Administration lines to each other and to all points on their own lines approximates 40,000 per day. Since August, 1918, the Elgin, Joliet & Eastern has been used more extensively as a connecting link between Eastern and Western trunk lines for the handling of through freight not requiring icing, while the through perishable business is being concentrated on the Indiana Harbor Belt. Prior to the consummation of joint switching arrangements, industries located on the St. Charles Air Line were served by 19 roads; they are now served by the Illinois Central for itself and all the Eastern roads except the Michigan Central, which does its own work, and by the Chicago, Burlington & Quincy for all Western roads. This is one instance of many that have not only simplified operation but have also effected a substantial saving in engine hours.

Passenger business on the Baltimore & Ohio and the Pere Marquette between Pine Junction and 16th street has been diverted to the tracks of the Pennsylvania Railroad in both directions, thus freeing the Baltimore & Ohio Chicago terminal of all passenger business with its retarding effect on freight movements and also shortening by seven miles the distance traveled and by 40 minutes the time required by each passenger train so diverted. Inbound carrier lines have consolidated through l.c.l. freight into gateway and destination cars at their transfer houses for the outbound carriers, thus avoiding the rehandling of that tonnage at Chicago and the incident delay and expense. This loading now approximates 200 cars per week. The previous practice of railroads returning to each other less-than-car-load merchandise delivered in error has been discontinued and such shipments are now forwarded by receiving roads to the proper lines.

In August, 1918, the various railroad agencies located in the Union stockyards district were consolidated and placed under one organization known as the Stock Yards District Agency. Subsequent to the establishment of the agency the business in that district increased approximately 25 per cent over the corresponding period of the previous year, and by reason of the consolidation this unprecedented volume of business was handled in an orderly manner. From August, 1918, to April, 1919, inclusive, there were received at the Union stock yards 249,935 carloads of livestock and 49,525 cars were forwarded. During the week ending January 11, 1919, all weekly records for livestock received were broken as there were received during that period 9,205 cars, while the month of January, 1919, surpassed all past records for monthly receipts of livestock with a total of 33,430 cars, the expeditious handling of which testified to the value of unified operation. In September, 1918, a joint agency in the Board of Trade building was established to handle collections from the various grain receivers.

#### Steps Taken in the Northwest

Steps have also been taken toward the unification of tracks, terminal and station facilities at Minneapolis and St. Paul, Minn., which have resulted in an estimated annual savings of \$217,534. The Twin City terminals are served by nine trunk and four switching lines and are under the direction of a federal manager, who is assisted by a terminal manager, the latter handling all detail matters. Each line within the terminal is represented by a superintendent or operating officer, who acts as a unit of the organization and reports to the terminal manager.

Under unified operation all industries at the Twin Cities having more than one switching line had their work assigned to one line, thereby saving duplication and also making for a saving in switch engine hours. All car orders are filled by the line upon which the industry is located, thereby avoiding cross hauling of "empties" through the terminals. Joint car inspection was established, which eliminated double inspection on all interchange tracks. A number of short haul movements were inaugurated, using any line or portion of

line necessary to accomplish them, resulting in a saving of time as well as of mileage. The principal gain in the use of equipment has been through pooling whereby the milling districts have been supplied with cars in better shape than for a number of years.

The saving in mileage by the short routing of freight through this terminal, effected principally at the Minnesota Transfer, was approximately 3,150,000 car miles. Terminal delays have been materially reduced as a result of the building up of solid trains for road movement, the elimination of cross hauling in switching movement and the avoidance of double switchings at industries. It is estimated that terminal detention during the past year has been reduced nearly 50 per cent, while, because of the unification movement, the federal manager reports that there has been no congestion in the Twin City terminals during that time.

In September, 1918, unification of the terminals on the Puget Sound at Everett, Wash., Tacoma and Seattle were put into operation. While the first 60 days of the working was not entirely successful, later experience has proven to all concerned the value of the unification, although no exact data as to savings are available. A review of changes made by the unification of the Puget Sound Terminals appeared in the *Railway Age* of August 1, 1919, page 203.

#### Central Western Region

The establishment of a one-line transfer service between Omaha, Council Bluffs and South Omaha is estimated to have saved 24 hours' delay daily and resulted in an annual saving of \$107,310. An annual savings of \$60,000 has been made by the consolidation of car inspection forces.

The joint switching arrangements put into effect in the Western region is estimated to have resulted in an annual saving of 133,200 engine hours and a total of \$799,200.

#### The Southwestern Region

At Galveston, Tex., the yards were operated as a unit and the interchange of cars was discontinued. Locomotive and car repair facilities were concentrated and freight houses were consolidated, as were local freight facilities. A central supervisory organization was established to administer the details of operation. There has been no congestion at Galveston since unification, the director asserts.

Little change was made in the operation at Houston, Tex., and Shreveport, La., where belt and terminal railroads were already in existence. At San Antonio, Tex., each railroad maintained its organization, kept separate records and carried its own terminal expense, etc. The unified organization in that city is comprised in a committee of the division superintendents of each road with the general manager of the San Antonio & Arkansas Pass as chairman. The unified terminal expense, including the salaries of the terminal trainmaster, the assistant terminal trainmaster and the clerical force, is divided between the railroads on the basis of the number of cars arriving at San Antonio on each road.

#### Conclusions

The outlook for the continuance of the unified operation of terminals following the return of the roads to private management is not bright. The consensus of opinion seems to be that it is an excellent thing but impossible of realization. While the benefits are numerous, the question resolves itself into the basic human principle that no one individual or corporation cares to create especially desirable facilities which a competitor may use equally as freely on their completion.

In general the most important benefits derived from unification are (1) the gain in the use of equipment through more expeditious handling, (2) reduction in terminal delay, resulting in a decrease in congestion and more expeditious service to shippers, consignees and the public generally, and

(3) a substantial saving in money. A secondary advantage is in the concentration of the handling of complaints.

The disadvantages of the unification of terminal facilities are few in number theoretically, but, in many cases, they present real difficulties. It has been urged that if a railroad knows that any terminal it may build can be used by any competing road that wishes to, it may refrain from building it. This argument is set forth with good reason. Another objection to unification is that the officers of the individual roads are better able to conduct terminal operation on their own line more efficiently than they could be conducted in a unified terminal. The practical railroad man knows that there are many physical difficulties in the way, particularly where no one road in a terminal center has facilities adequate to care for the combined business of the several railroads in the area. Another objection has been made by some shippers and consignees that the unification already carried out by the government caused them great inconvenience in making it necessary to go considerable distances to send and collect their freight after their business houses had been located with reference to the proximity of the terminal of the railroad which they patronized.

One of the most difficult and important problems in the country is that of terminal facilities. It probably means more to the producing and consuming public in the matter of delays, inconvenience and transportation burdens than any other phase of transportation. Generally speaking, cities and railroad traffic have outgrown existing terminal facilities. The outstanding shortcoming in railroad transportation is inadequate terminals, and there can be no successful solution of the railroad problem which does not provide for their betterment. The time is past when wasteful terminal operation will be permitted to continue unchallenged. The willingness or the unwillingness of the carriers to acquiesce in such co-operative arrangements as plainly make for increased efficiency will be the deciding factor in the coming season of trial for private operation.



The Return from the Wars

From the N. Y. Herald

## Troop Movement

THE TROOP MOVEMENT SECTION has won high praise for the smoothness and efficiency with which it has operated, in spite of the tremendous problems faced. From May 1, 1917, to December 1, 1919, 15,724,058 men, either just drafted or in uniform, were handled, the average being 507,421 a month, the maximum moving in July, 1918, when 1,147,013 men were handled. These men were carried the equivalent of nearly seven billion miles for one passenger.

To handle this tremendous business 315,367 Pullmans, coaches and baggage cars were used; 25,909 special troop trains were run an average distance of 759 miles, with an average number of men per train of 424; 4,109,327 men were carried in Pullman cars and 11,614,731 in coaches. Scarcely an accident marred this wonderful transportation record.

The average distance that drafted men were carried to camp was 388 miles, and the largest number handled to a single camp was 138,349, who were sent to Camp Lee, Va.

In transporting these men to seaboard the largest movement occurred in August, 1918, embracing 306,741. Sometimes entire army divisions of 28,000 men were moved at a time. To move a division requires 62 trains, 707 Pullmans (or 622 coaches), 62 kitchen cars and 62 baggage cars. Some of these trains were moved solid 3,500 miles across the continent.

Eighty per cent of the men were sent overseas through New York, 12 per cent through Newport News and a number through and out of Canada.

Four million men were called to the colors, one-half of whom were transported across the Atlantic. Immediately upon the signing of the armistice plans were made to demobilize as many as possible of the 2,000,000 men who had not gone overseas. They were discharged at the camps, all necessary arrangements being made for extra equipment on regular trains and for special trains for their prompt and comfortable movement home.

The overseas return movement began in December, 1918, during which month approximately 75,000 men were returned through the ports of New York, Newport News, Boston, Charleston and Philadelphia. The return movement gradually increased until the maximum number was reached in June, 1919, when 343,000 men were handled. This number exceeded by over 36,000 the largest number embarked for overseas service in any one month. At certain periods over 170,000 of our men were on the sea at one time. The number returned from overseas to December 1, 1919, totaled 1,990,223 officers and men.

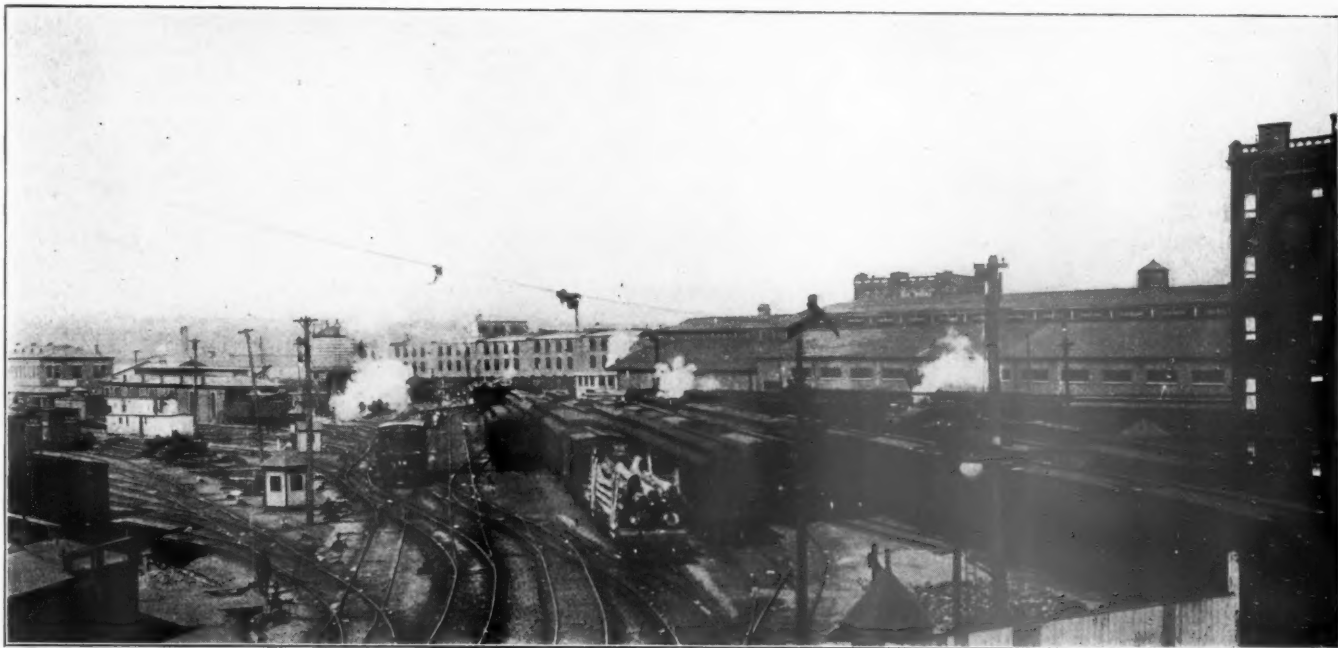
The maximum amount of equipment required for troop movements at one time was approximately 1,500 Pullmans, 2,500 coaches and 500 baggage or express cars.

This wide-spreading and huge undertaking taxed the resourcefulness of everyone, but even during the turmoil cleanliness was not overlooked. Certain equipment was allotted for handling the men from shipside to camp, where the men were fumigated, as was also the equipment.

The late George Hodges, to whom the distinguished service medal was posthumously awarded, was the man whose initiative and executive ability shone forth in this work. He was ably assisted by C. F. Stewart, who succeeded Mr. Hodges as manager of the Troop Movement Section.

DOG TEAM STAGES are to be used to transport freight between the ends of the southern and northern sections of the railroad which the United States Government is building in Alaska, according to recent press despatches from Nenana. A distance of about 130 miles separates the ends of the line being built south from Fairbanks and the line being built inland from Seward.





## The Growth and Results of Car Service Activities

Organizations to Control Freight Equipment Accomplished  
Excellent Results in Crisis

**T**HE RAPIDLY INCREASING FREIGHT TONNAGE offered to the railroads of the country for movement, accentuated in 1917 by the entrance of the United States into the war with the consequent quickening of industry and production, and the acute shortage of freight car equipment, demanded immediate and drastic action to avoid a complete tieup of the nation's transportation system. The condition and amount of the freight equipment in the United States has been such since 1916 that the enormous amount of war materials, foodstuffs and other commodities could not have been moved without the delegation of certain powers to a responsible and efficient organization. The responsibility for the exercise of these powers, therefore, fell first upon the Commission on Car Service of the American Railway Association and later upon the Car Service Section of the United States Railroad Administration.

### Car Service Work Prior to Government Control

In discussing the accomplishments in the car service field during the past few years, it is necessary to review briefly the history of this phase of railway operation in order to obtain a background for a complete understanding of the steps which have been taken and the results which have been accomplished. Car service work in general began when the demand for freight equipment was greater than the available supply.

During the latter part of 1916 it became apparent to

the American Railway Association that it would be necessary to arrange for a representative committee to sit in Washington and co-operate with the Interstate Commerce Commission on car service matters. Accordingly Fairfax Harrison, W. L. Park, C. M. Sheaffer, E. J. Pearson and W. A.

Worthington were appointed to constitute such a committee, which continued to function until February 6, 1917. At a meeting of the American Railway Association held in New York on February 2, 1917, a new code of car service rules was adopted by the signatures of members of the association to an agreement to observe and enforce the rules, subject to three months' notice of intention to withdraw from the agreement. At this time a resolution was adopted authorizing the president, W. W. Atterbury, to appoint a Commission on Car Service of five members with plenary powers to co-operate with the Interstate Commerce Commission by sitting in Washington in the administration of the new code of car service rules and to make such necessary modifications in these rules as were re-

**P**PRIVATE CONTROL recognized the futility of meeting the traffic demands with the available equipment, unless drastic action could be taken. The Commission on Car Service was conceived as a result.

Profiting from the experiences of this Commission the Railroad Administration created the Car Service Section.

The conditions which brought about these steps have not been changed; the result must be a continuance of centralized supervision over the distribution of freight equipment.

quired to prevent undue hardships.

The commission consequently appointed consisted of C. M. Shaeffer, general superintendent of transportation of the Pennsylvania Railroad, chairman; W. A. Worthington, vice-president and assistant to the chairman of the Southern Pacific; J. T. King, general superintendent of transportation, Atlantic Coast Line; W. C. Kendall, superintendent of car

service, Boston & Maine, and W. L. Barnes, superintendent of transportation, Chicago, Burlington & Quincy. This committee was reconstituted at a meeting of railway executives in Washington on April 11, 1917.

The Commission on Car Service was made a sub-committee of the Special Committee on National Defense (Railroads' War Board) and continued under the jurisdiction of the executive committee up to the time of the institution of government control as a war measure. The committee at this time had been enlarged by the appointment of Macy Nicholson, assistant to the vice-president of the Great Northern; G. F. Richardson, superintendent of transportation of the Southern Pacific; J. A. Somerville, general superintendent of transportation on the Missouri Pacific; D. E. Spangler, superintendent of transportation on the Norfolk & Western, and H. W. Stanley.

The new situation created by the declaration of war with Germany by the United States and the unprecedented increase in freight traffic offered to the railroads gave the Commission on Car Service an opportunity to attempt to distribute the available freight equipment of the country so that it would fill the traffic requirements as adequately as possible. Full authority was conferred on the commission by the executive committee of the Special Committee on National Defense to amend or suspend any rules affecting the handling of freight cars; to relocate such equipment, and to issue such rules, regulations or instructions as the exigencies of the situation required. New rules and regulations to govern the handling of freight cars were promulgated by the commission and approved by the executive committee, under which arrangement the commission acted virtually as the manager of a car pool embracing all the railroad owned freight equipment in the country. The enforcement of these new rules, which were essentially war measures, and the necessity for giving precedence and preference to the transportation of troops and war materials, necessitated the expansion of the Commission on Car Service, and before long a considerable office force and 18 inspectors, who conducted investigations and kept in touch with conditions at the principal centers of interchange, were working under its jurisdiction.

In addition, it was found necessary under the new regime to organize local committees at 25 important commercial centers to act for and in conjunction with the representatives of all lines in the city. This move was taken to decentralize as far as possible the work of the commission and enable it to devote more time to the consideration of the larger problems of car service. These local committees met twice a week and the scope of their action was not restricted except by general instructions and the car service rules. They were expected to anticipate difficulties; to supply remedies and to avoid complications, in addition to which they were to give special attention to such matters as the intensive loading of cars and the elimination of delay in loading and unloading. Furthermore, they kept in close touch with shippers, assisted in reducing accumulations of cars, administered embargoes, regulated car supply, and in general took care of many of the details which otherwise would have had to have been considered by the commission at Washington, the members of which were not as well versed in the local conditions existing at various points throughout the country and could not therefore formulate opinions as readily or as successfully.

#### The Car Service Section

This work was carried on by the Commission on Car Service up to the time of the inauguration of government control and operation. At this time the need for including the work performed by the commission as a function of the United States Railroad Administration was clearly seen and the Car Service Section formed by the merger of the Com-

mission on Car Service and the Bureau of Car Service of the Interstate Commerce Commission was one of the first agencies created in the Division of Transportation. The officers of the new section included the members of the Commission on Car Service, with W. C. Kendall as manager. W. L. Barnes, E. H. De Grott, Jr., A. G. Gutheim, C. B. Felts, G. F. Richardson and J. A. Somerville were appointed assistant managers.

At the time of this conversion it was stated that the functions of the new Car Service Section should include the provision of equitable distribution of the various classes of freight car equipment, the regulation of transportation details to meet emergencies, and the maintenance of a proper balance between the government, the public and the carriers. The regulations issued at that time relative to the establishment of the new section stated that it should have charge of all matters relative to car service, including the relocation of freight cars; that it would provide, through the regional directors, for preference of car supply and movements where more than 10 cars were required; that it would receive such reports from the railroads as were required to keep it informed in regard to car service, embargoes or transportation conditions; that it would be informed promptly of all embargoes placed, modified, or removed, and that it would recommend embargo policies.

The Car Service Section as constituted at that time consisted of a central organization at Washington, the Eastern Railroads Car Pool with headquarters at Pittsburgh, Pa., and the various sub-committees which had been appointed under the regime of the Commission on Car Service. On July 1, 1918, a Refrigerator Car Department was organized at Chicago and placed under the jurisdiction of Mr. Barnes. At the same time a Tank Car Department to assist in the relief of a shortage of freight cars was organized in connection with the Refrigerator Car Department with headquarters at Chicago. On May 15, 1918, the activities of the Car Service Section were further extended by the establishment of a Car Record Office which compiled information regarding the location and movement of cars carrying material for the various government departments.

These facts complete the history of the Commission on Car Service and its successor, the Car Service Section of the United States Railroad Administration. With this brief history as a background, it is but fitting to outline the results the two organizations have accomplished during their existence. It must be remembered in this connection that the Car Service Section is, in reality, an inheritance from private control, and the results which have been accomplished cannot therefore be said to be entirely a result of governmental control and operation. It is true, however, that under such a form of unified control this section has been granted a latitude which would hardly be possible under the competitive conditions incident to private control.

#### The Result of Car Service Work

The pooling, distribution and relocation of freight equipment comprises the most important function of the Car Service Section. In addition there are several other functions which have been delegated to the Section which should properly be reviewed. Among these are the maintenance of a proper balance between the government, the public and the carrier; the handling of embargoes; the campaigns for the heavier loading of equipment; the establishment of adequate car service records, and the successful contact established with the shipping public.

In so far as the first and most important of these functions is concerned, the elimination of competitive conditions left the Car Service Section free to move empty freight cars to meet requirements at various points in the country, regardless of ownership. As evidence of what has been done in this respect it has been cited that during 1918 there were



850,000 such movements, including the movement of 700,000 box cars, but excluding the emergency movement of refrigerator cars and the relocation of coal cars between the various coal fields.

The Eastern Railroad Car Pool, which was inherited from private operation, was continued under the jurisdiction of the Car Service Section and aided in the proper handling of freight, especially coal in the eastern states. The idea of pooling equipment, which was taken from this inheritance or private control, was, to a certain extent, extended to the handling of all freight equipment of all the lines under federal control. The Car Service Section acted in general as the agency by means of which this pooling was controlled. Technically speaking, however, it is not possible to say that all of the freight equipment of the country was thrown into one car pool. The car service rules which have been in effect do not admit of this condition entirely, although in a general way the statement is true. The pooling of equipment, however, was extended to the Refrigerator Car Department upon the establishment of that institution and the refrigerator car equipment of the country was operated through this one agency, an abnormally heavy perishable commodity traffic being moved in this manner.

Certain advantageous results have been produced by this pooling, relocation and distribution of freight equipment. During the period of the war there was an urgent demand made upon the Railroad Administration for the expedited movement of lumber for use in the aviation section of the army, for constructing ships at the large ship yards and for other government work, such as the construction of cantonments and living quarters for war workers. The work accomplished by the Car Service Section in this respect may best be illustrated by stating that from April 21, 1918, to November 20, 1918, 150,000 cars of lumber were moved from the Pacific Northwest, or an average daily movement of 813 cars. The movement of coal and coke was another problem with which the Railroad Administration was confronted and which the Car Service Section solved successfully. The success of the extraordinary measures adopted to bring about this solution are demonstrated by the fact that practically all of the demands of the steel industry for coke, by-product coal and steam coal were met. In this connection it must be recalled that the Car Service Section, on October 10, 1918, established uniform rules for rating of coal mines by which the car supply is directed, which rules superseded previous methods which had led to different interpretations being placed upon the ratings of coal mines by different carriers. It is not possible to go into detail regarding the work which has been accomplished by the Car Service Section in the handling of the various commodities offered for traffic, but the two illustrations above tell the story of practically all other traffic.

From the maintenance standpoint, however, car pooling has proved to have some disadvantages. Under the provisions of the car pool, freight cars, when once leaving the home rails, do not tend to return toward the home line as long as they are in condition to be operated. The result has been that a very high percentage of the equipment on lines has been made up of foreign cars. This condition, in a measure, has led to a feeling of unjustified apprehension as to the condition of the equipment of the country owing to the fact that, generally speaking, only the cars badly in need of heavy repairs return to the home line, where the bad average condition of such equipment leads to an unjustified conclusion as to the equipment on foreign lines. The provisions of the pool have, however, increased the difficulties of properly repairing freight cars owing to the lack of proper material with which to maintain the equipment on foreign lines. It has also held up the betterment programs, which many roads already had under way and others were about to undertake, to rehabilitate much of the

old wooden equipment of the country, so that it would be suitable for continued service under modern operating conditions.

### Embargoes and the Permit System

From its inception the Car Service Section was responsible for the supervision of embargoes issued by railroads. The first plan adopted by the section established 26 zones throughout the country in which embargoes were issued simultaneously to each road in the zone in which the embargo was placed. This system was later greatly improved by a reduction in the number of zones and still further simplified by making the zones conform more nearly to the geographic regions into which the country had been divided for operating purposes.

The permit system was later installed by the Car Service Section because of the increased activities of many of the government departments and the critical transportation conditions in the winter and spring of 1918. War-time necessity caused individual roads and various government organizations to authorize special movements of government and other important freight in violation of the general embargoes which it had been believed would be adequate to prevent congestion. It was therefore agreed by the Car Service Section that uniform embargoes and a permit system should be installed. This permit system developed in two ways, one providing general and continuing exemption from embargoes for special commodities, and the second providing special exemption from embargoes or special shipments according to the need of the consignee and of public welfare. The second development later became general and the Car Service Section was called upon to control and regulate the issuance of these permits carefully.

All of the plans enumerated were later subjected to improvements. For instance, the issuance of embargoes was, comparatively recently, placed to a large extent under the jurisdiction of the various regional directors who are more closely in touch with the particular requirements of various sections of the country. However, throughout all of the refinements, which the issuance of embargoes and the administration of the permit system have gone, the Car Service Section has remained the real controlling agency in this work.

### Car Service Section Campaigns

The Car Service Section, since its creation, has advocated many measures, the success of which has depended more upon shippers than upon the administration of orders. Probably the most successful and vital of these measures was the campaign conducted for the heavier loading of freight equipment. It was pointed out to the shipper in no uncertain terms that heavier car loading meant the release of a number of much needed cars for the handling of essential traffic.

Not only did the Car Service Section recommend heavier loading, but it also advocated changes in the size and in the manner of constructing packages and in the manner of placing goods in the packages, all of which contributed to the heavier and more efficient loading of freight car equipment and the consequent release of other equipment, which would in turn alleviate a serious shortage at other points.

Another campaign which produced excellent results in the more efficient use of freight equipment was the campaign for the advance movement of certain commodities. Early in April, 1918, traffic organizations and shippers were told of the advantages of shipping raw materials in the summer when traffic ordinarily is comparatively light. This plea met with a generous response on the part of the shipping public and the result was that when the critical months of the fall and winter came, it was found that the tension was greatly relieved because of the decreased amount of raw materials offered for movement.

### Future of the Car Service Section

The Car Service Section of the United States Railroad Administration cannot properly be termed an innovation connected with government management. As stated before, the work which was taken over by the Car Service Section was performed successfully under private control by the Commission on Car Service. It is therefore quite generally conceded that the functions which the Car Service Section now perform will be taken over by some organization when the return to private control is made, since the necessity which first created the Commission on Car Service still exists. Therefore it is practically certain that the functions of the Car Service Section will be delegated either to a committee of the American Railroad Association, to a committee which will work in conjunction with the Interstate Commerce Commission or perhaps to a separate bureau which may be maintained in Washington under the jurisdiction of the Interstate Commerce Commission or as a government institution.

It is probable that the latitude which is now allowed the Car Service Section will be curtailed to some extent, for the competitive conditions of private control have not and will not make for complete harmony in the pooling, relocation and distribution of freight equipment. It is to be hoped that this power may be retained in some organization, at least until the number of available freight cars is large enough to meet the normal traffic demands of the country. Even then it is similarly hoped that the functions now performed by the Car Service Section can be retained at least as dormant measures which can be brought to life again should the necessity arise.

### Coal Exports Permitted

**DIRECTOR GENERAL HINES** has authorized the following statement regarding the coal situation:

"In the two weeks which have passed since the bituminous coal miners returned to work generally, production has increased regularly. This has afforded a great measure of relief in those consuming sections customarily supplied by miners in the central competitive field and in the Southwest and in which sections consumer's stocks have been much depleted. Indicative of the better condition of such stocks is the fact that many of those consumers who were eager during the strike to obtain coal from the fields which had continued to produce in the East, have refused now to take such coal which the railroads moved West during the strike to protect such consumers, the additional freight rate from the East naturally entering into the price of the coal. It is necessary under these circumstances, that production of the Eastern fields be again turned into usual channels and usual markets, and among the latter is the overseas export market. Otherwise, a serious congestion of coal loads will inevitably develop on the railroads.

"After careful consideration of the entire situation, it has been deemed advisable to permit restricted resumption of overseas export movement of bituminous coal. Instructions have already been issued for such movement through the ports of Hampton Roads and Baltimore in an amount equal to about 50 per cent of the export tonnage handled through those ports in the month of October. Similar arrangements will be made at other ports as soon as the necessary details now under way can be perfected. At each port, however, the export dumping will be only allowed upon a restricted basis, the restrictions being made effective by railroad embargoes against the movement of coal to tidewater ports for export, and the issue of permits by railroads under the control of the regional directors authorizing the movement of specific coal against such embargoes.

"During the past two weeks, while production has been on the increase special provisions have been made for the export of coal to Cuba necessary there for sugar production ultimately to be moved to this country. In addition, a few other cargoes have been permitted by the Central Coal Committee, acting in conjunction with the representatives of the destination countries concerned, in order to take care of vital necessities among our allies, and also of foreign consumers whose output was contracted to be shipped to the United States.

### Passenger Train Performance in November

**D**URING NOVEMBER 86.5 per cent of all passenger trains on Class I railroads under federal control made on-time runs or, if late at initial terminals on account of waiting for connecting trains, made as good as schedule time or better, according to a statement issued by the Railroad Administration. This is a slight decrease compared with October, when the percentage was 88.2 per cent.

In the same period 81.7 per cent of all passenger trains arrived at their destination on time, compared with 83.9 per cent in October.

Factors affecting train performance in November were the severe winter weather in northern and mountain states, heavy and continued rains in the South and Southeast, and the dislocation of traffic due to the coal strike, which also resulted in the necessity for using inferior locomotive fuel in certain sections.

Following are comparative figures showing passenger train performance in the various regions during November and October. Suburban trains are not included in this compilation:

Region	Month	No. of roads	Total trains operated	Trains which arrived on schedule time		Trains which arrived on schedule time, or which, if late, made run in schedule time or less			
				Number	Per cent of total trains	Number	Per cent of total trains		
Eastern .....	Nov.	43	87,957	75,027	85.3	77,966	88.6		
	Oct.	43	93,659	80,593	86.0	83,664	89.3		
Allegheny ....	Nov.	15	72,938	64,525	88.5	67,040	91.9		
	Oct.	15	77,480	68,286	88.1	70,882	91.5		
Pocahontas ...	Nov.	3	8,421	7,277	86.4	7,495	89.0		
	Oct.	3	8,923	7,897	88.5	8,262	92.6		
Southern .....	Nov.	34	48,669	40,831	83.9	43,298	89.0		
	Oct.	33	49,945	43,440	87.0	45,222	90.5		
No. Western...	Nov.	15	24,149	17,149	71.0	18,351	76.0		
	Oct.	15	26,274	21,288	81.0	22,286	84.8		
Cen. Western..	Nov.	24	41,579	30,516	73.4	33,968	81.7		
	Oct.	24	43,091	33,224	77.1	36,207	84.0		
So. Western...	Nov.	22	20,005	12,816	64.1	14,721	73.6		
	Oct.	23	20,806	13,772	66.2	15,724	75.6		
Total and average for...			Nov.	156	303,718	248,141	81.7	262,839	86.5
All regions...			Oct.	156	320,178	268,500	83.9	282,247	88.2

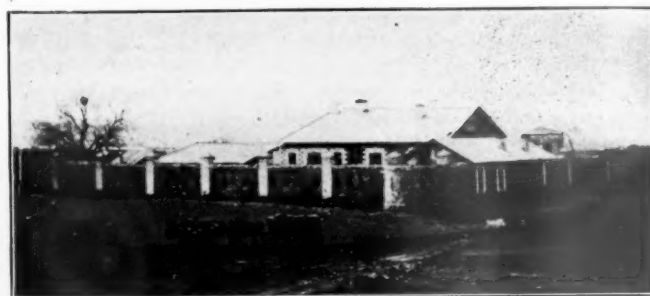
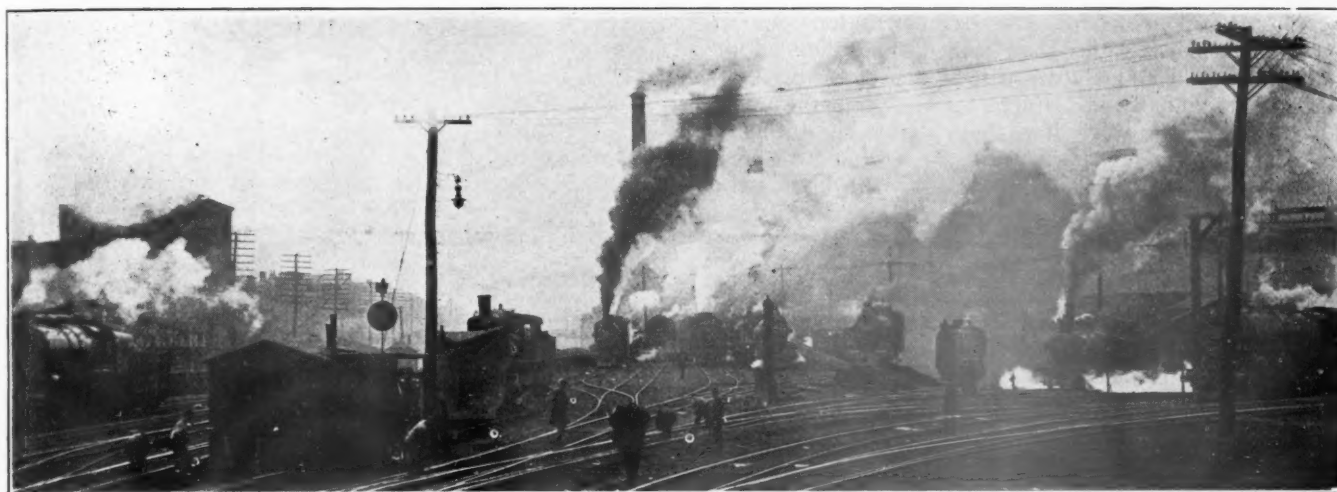


Photo by Courtesy of C. M. Winter.

With the Russian Railway Service Corps. A Fortified Railroad Section House





## Fuel Conservation Effort Should Be Continued

Benefits Already Secured May Be Lost Unless Some Agency  
Is Provided to Carry on the Work

**D**URING THE TWO YEARS of its existence the United States Railroad Administration has put into practice many plans and developed organizations for centralized control of many phases of railroad operation which are unique in the annals of American railroad history, but not all of which are well adapted to continuation under private operation. These were primarily adopted as war measures, but the economic value of the results obtained in some cases has led to the serious consideration of how these activities may effectively be continued after the roads have been returned to be operated by their owners.

As has already been suggested, there are certain fundamental difficulties in the way of continuing under private control the work of any of the centrally organized departments of the Railroad Administration. Perhaps the most important of these difficulties is the strong feeling on the part of corporation and operating officers alike against the continuance of any centralized administrative control tending to usurp the responsibility and initiative of the local organizations in the management of their own properties.

Another serious difficulty is the lack of machinery for continuing any of the activities of the central administration, except such as is offered by the American Railroad Association, and this is an organization not adapted to function as an administrative body. The sentiment against the curbing of initiative in the fullest possible development of the talents of the individual is undoubtedly for the best interests of the future of American transportation and in keeping with American ideals. In the present situation, however, the fact should be recognized that many possibilities for the future welfare of the railroads have been developed by the Railroad Administration, and all prejudices should be laid aside in considering how these benefits may best be perpetuated.

In this connection the Fuel Conservation Section occupies a unique position. In a review of the history of the organization of and the methods employed by the section, which appeared on page 1011 of the November 21 issue of the *Railway Age*, the problem of the administration which led to the organization of this section is clearly stated. The public need for the most rigid economy in the use of fuel,

as a war measure, was generally recognized, and the need for economy in the expenditure of the more than **one-half** billion dollars a year paid by the railroads for fuel, as a matter of good business is no less apparent.

The real problem of the section has been to secure recognition of the principle that the administration of this vast sum needs a supervision which cannot be obtained by any of the regularly organized departments of railroad operation, to none of which the most economical use of fuel is a matter of primary importance. The work of the section was, therefore, less administrative than educational and inspirational, the latter probably being the more important of the two.

The results obtained in the reduction of fuel consumption have been due less to a previous lack of knowledge as to the proper methods of handling and firing coal than to the incentive which has been supplied to each individual to put into practice the knowledge he already had. No previously untried methods have been developed by the Fuel Conservation Section; the essential facts and details of practice have been brought out and reiterated year after year in the reports and discussions at the annual conventions of the International Railway Fuel Association. The greater part of the educational work has been in convincing operating officers and executives of the need of a department the principal business of which is to secure the best fuel possible for the money spent and to see that no one is allowed to waste it.

The effectiveness of the inspirational work of the section alone is sufficient evidence that well-organized staff fuel supervision is essential if waste is to be eliminated. It is this principle, however, which years of effort on the part of the International Railway Fuel Association has been unable to bring to the attention of railway managements with sufficient force to overcome the prejudice and inertia in the way of the firm establishment of the fuel department as a regular part of the railroad organization. Judged by past developments, the work of the Fuel Conservation Section has advanced the status of fuel conservation farther than would have 10 or 15 years of normal pre-war development. This in a large measure was made possible by the extent to which patriotic zeal overcame prejudice during the war and to the

adoption of methods in the conduct of the affairs of the section which removed rather than excited opposition.

Much can and undoubtedly will be done by many of the railroads individually in maintaining and strengthening the staff organizations which have been developed during the war to handle fuel matters, whether or not a central organization is retained after the return of the railroads to private control. On many railroads, however, these organizations have not been installed for a sufficient length of time to function smoothly in relation to other departments, and there is grave danger that if left to themselves they will not be sufficiently strong to weather the reaction following the inspired efforts put forth during the war. For this reason every effort should be made to develop a practical means whereby the work of the Fuel Conservation Section may be continued until such time as correct principles of fuel control have become generally and firmly established in practice on the railroads of this country.

The principal objection to turning the work of the Fuel Conservation Section over to the American Railroad Association has little force in this case. The work of the section has essentially not been of an administrative character, and while the full authority of the Railroad Administration was back of the officers of the section, in practice this was almost never exercised. The methods which the section has so successfully developed lend themselves satisfactorily to the control of a non-administrative body, and with the same tact and patience which has been exercised by the personnel of the section during the war there is reason to believe that under the American Railroad Association excellent results could be obtained in consolidating and holding the gains already made.

One of the instruments of the section which can ill be spared at the present time is the comparative summary of locomotive fuel performance by railroads which has been compiled and published quarterly. The permanent maintenance of such information would be of great value, as comparative data of this kind may be very effectively used in keeping up a keen interest in fuel conservation. Whether or not they are maintained permanently, they should at least be continued for another year, or until such time as a fair measure of the full possibilities of fuel conservation become apparent.

The cost of continuing the work of the Fuel Conservation Section, estimated by the manager of the section as having amounted to three-tenths of one per cent of the value of the fuel saved during 1919, would be insignificant when distributed among the railroad companies benefiting. This, of course, does not include the cost of maintaining the fuel departments on each road, but these must, and if properly developed will, justify themselves in each case by preventing the waste of the funds paid out for one of the largest single items of railroad operating expenses.

Should the railroads as a whole, through the American Railroad Association, fail to continue the work of the section it would be entirely feasible for the principal roads in each regional district to take up the work, maintaining practically the present organization, the expense to be pro rated on the basis of gross earnings. Under this plan a central office should be maintained for the purpose of combining the regional statistics substantially as they are now compiled by the Fuel Conservation Section. The prospect for continued improvement in the unit fuel consumption, which for the three months of July, August and September, 1919, decreased 5.2 per cent in freight service and 3.5 in passenger service from the figures for the same period of 1918, would fully justify the slight expense of such a course or as many years as are required to develop the organizations and personnel needed on each railroad.

## Supply Train Operation

THE SYSTEM of supply train operation as practiced on the Southern Pacific has been made the subject of the first product of the Southern Pacific's complete plant for making and presenting motion pictures. This picture, recently displayed at the convention of Railway Storekeepers in Chicago, received the approval of officers of the Store Section of the United States Railroad Administration, according to an article in a recent issue of the Southern Pacific Bulletin.

In describing this system the Southern Pacific Bulletin says in part:

"There are four supply trains operating monthly over 5,175 miles of main line and branch, and delivering every four weeks nearly 6,000 tons of miscellaneous material and supplies valued at \$140,000. In turn, these trains collect about 3,000 tons each month of scrap and second-hand material; the number of requisitions handled is over 7,000.

"While the difference between delivering material by local freight and by supply trains represents an annual saving of well over \$100,000, there are many advantages in supply train operation that cannot be estimated in dollars and cents, one of the most important being service. Supply trains carry a small surplus stock of the more important items over and above requisition requirements, and there is never a day they do not get many requests for material or supplies other than those called for on requisitions.

"Many times newly organized extra gangs are completely equipped with tools and supplies from these trains, thereby saving express and baggage shipments, and in some cases wires and correspondence, and at times expensive delays.

"By an established monthly supply train service material and supplies on line can be limited to actual thirty-day requirements, thereby avoiding waste, abuses, etc. The exchange system of tools, brooms, electric lamps, oil containers and everything that can be exchanged, results in much economy.

"Under the old system of delivering company material by local freight it often happened that owing to incorrect description shown on requisition the material shipped was other than what was actually required, and if not immediately returned was, in most cases, allowed to lie around and deteriorate until such time as the storekeeper or some division officer happened across it and ordered it shipped in.

"Under the supply train system the division storekeeper and supply car storekeeper come into direct contact with the users of material and are in position to and do accomplish many substitutions, and correct on the ground, many errors. This also frequently avoids unnecessary purchases and eliminates an enormous amount of correspondence and return shipments.

"Another important feature in connection with this service is that it delivers the material where it is to be used. Frogs, switches, etc., are unloaded at points where they are to be installed. Culvert lumber, cattle guards, etc., are handled in a similar manner.

"Two of these trains operate out of the Sacramento general store and two from Los Angeles general store. Some of the branches are only covered every sixty or ninety days, as business does not warrant a thirty-day service.

"Superintendents usually accompany the supply train with their division engineer, roadmaster, signal supervisor, etc. This means a thorough monthly inspection of their division. Fire and watch inspectors also use this train to cover their districts, which would otherwise necessarily have to be covered by a motor car."

ALASKA'S MINERAL OUTPUT in 1919 is valued at about \$18,850,000, while that of 1918 was valued at \$28,254,000.



# UNITED STATES RAILROAD ADMINISTRATION

Department of Commerce

## PASSENGER TRAIN AND PASSENGER LOCOMOTIVE PERFORMANCE (Mixed Trains NOT included)

For month of JUNE, 1919, compared with same month of previous year

TRAIN PERFORMANCE														LOCOMOTIVE PERFORMANCE																			
Line	PASSENGER TRAIN MILES (Thousands)						PASSENGER TRAIN CAR MILES (Thousands)						Per Cent Change	GAS MILES PER TRAIN MILE						PER CENT LOCOMOTIVE MILES TO TRAIN MILES						AVERAGE NUMBER OF PASSENGER LOCOMOTIVES							
	This Year	Last Year	Per Cent Change	This Year	Last Year	Per Cent Change	This Year	Last Year	Per Cent Change	This Year	Last Year	Per Cent Change		This Year	Last Year	Per Cent Change	This Year	Last Year	Per Cent Change	This Year	Last Year	Per Cent Change	This Year	Last Year	Per Cent Change	This Year	Last Year	Per Cent Change	This Year	Last Year	Per Cent Change		
1	4.7	5.081	2.707	6.8	3.047	2.090	6.9	10.355	13.158	8.0	6.0	5.8	103.9	103.8	103.7	946.0	1.035.4	1.193.0	38.7	35.7	8.2	103.9	103.8	103.7	946.0	1.035.4	1.193.0	38.7	35.7	8.2			
2	4.0	6.323	6.083	3.9	6.855	6.276	4.6	45.877	44.523	2.4	7.3	7.0	104.1	104.0	1.039.7	1.097.6	2.199.6	2.191.8	28.1	28.8	2.0	104.1	104.0	1.039.7	1.097.6	2.199.6	2.191.8	28.1	28.8	2.0			
3	6.3	1.239	1.239	7.0	1.239	1.239	7.0	1.239	1.239	7.0	3.3	3.4	103.6	103.9	275.0	278.4	277.3	241.9	236.9	20.0	22.1	103.6	103.9	275.0	278.4	277.3	241.9	236.9	20.0	22.1			
4	5.5	10.203	9.995	9.1	10.110	10.197	5.3	63.901	66.347	3.8	4.7	4.8	103.6	103.9	2.754.4	2.735.7	2.735.7	2.735.7	2.735.7	2.735.7	2.735.7	103.6	103.9	2.754.4	2.735.7	2.735.7	2.735.7	2.735.7	2.735.7	2.735.7			
5	7.0	7.218	7.305	7.0	8.183	7.613	7.5	43.541	42.897	12.6	5.4	5.4	102.0	102.0	1.657.1	1.665.0	2.369.3	2.321.7	30.6	19.6	114.2	102.0	102.0	1.657.1	1.665.0	2.369.3	2.321.7	30.6	19.6	114.2			
6	17.9	952	952	15.4	1.029	910	16.2	8.493	9.351	23.4	8.6	8.6	104.1	104.0	220.8	227.6	291.6	236.0	20.5	15.4	118.3	104.1	104.0	220.8	227.6	291.6	236.0	20.5	15.4	118.3			
7	9.5	6.714	6.782	4.0	6.647	6.708	4.0	33.742	40.389	4.0	8.0	8.0	100.4	101.2	1.361.6	1.391.3	2.017.6	1.989.2	24.8	13.5	112.3	100.4	101.2	1.361.6	1.391.3	2.017.6	1.989.2	24.8	13.5	112.3			
8	6.8	6.242	6.301	2.4	6.543	6.434	2.4	39.594	38.709	2.3	8.4	8.4	101.3	101.4	1.532.7	1.630.5	2.030.3	2.025.0	24.1	18.7	104.8	101.3	101.4	1.532.7	1.630.5	2.030.3	2.025.0	24.1	18.7	104.8			
9	2.3	1.046	1.046	2.3	6.290	6.175	2.3	57.230	53.192	6.5	7.3	7.3	103.0	103.0	1.886.2	1.886.2	2.890.1	2.890.1	27.8	27.8	106.7	103.0	103.0	1.886.2	1.886.2	2.890.1	2.890.1	27.8	27.8	106.7			
10	2.3	3.975	3.984	2.3	1.516	1.499	2.3	23.540	23.201	2.3	6.1	6.1	100.9	100.9	936.7	978.1	1.130.7	1.130.7	24.9	24.9	115.4	100.9	100.9	936.7	978.1	1.130.7	1.130.7	24.9	24.9	115.4			
11	2.6	64.176	63.077	2.6	45.120	44.304	2.7	203.526	272.241	4.1	6.5	6.5	102.0	102.0	30.547.7	11.200.4	14.231.7	13.952.3	28.0	19.4	105.6	102.0	102.0	30.547.7	11.200.4	14.231.7	13.952.3	28.0	19.4	105.6			
12	31.4	31	31	31	31	31	31	31	31	31	31	31	102.4	102.4	102.4	102.4	102.4	102.4	102.4	102.4	102.4	102.4	102.4	102.4	102.4	102.4	102.4	102.4	102.4	102.4			
13	1.3	311	356	1.3	82	89	2.1	1.980	1.641	2.7	2.8	2.8	103.4	103.4	103.4	103.4	103.4	103.4	103.4	103.4	103.4	103.4	103.4	103.4	103.4	103.4	103.4	103.4	103.4	103.4			
14	6.9	69	69	6.9	279	279	3.3	4.312	4.445	0.3	3.3	3.3	101.7	101.7	101.7	101.7	101.7	101.7	101.7	101.7	101.7	101.7	101.7	101.7	101.7	101.7	101.7	101.7	101.7	101.7			
15	6.3	36	36	6.3	1	1	37	36	0.7	1.37	1.36	8.7	2.2	2.2	1.7	3.8	2.1	1.3	3.6	100.2	100.2	11.0	14.0	14.0	100.2	100.2	11.0	14.0	14.0	100.2	100.2		
16	19.6	41	71	19.6	2	1	38	73	13.2	631	243	17.5	2.2	2.2	0.5	3.4	2.1	0.4	3.5	100.0	100.0	22.3	27.0	27.0	100.0	100.0	22.3	27.0	27.0	100.0	100.0		
17	61.7	2	22	61.7	1	1	32	23	29.5	1.63	1.22	34.4	2.0	1.1	2.1	5.2	3.1	3.0	2.3	100.0	100.0	6.0	7.0	10.0	100.0	100.0	6.0	7.0	10.0	100.0	100.0		
18	6.8	139	139	6.8	4	4	303	193	5.9	1.046	1.053	9.0	2.4	1.3	3.1	5.6	3.6	1.1	3.1	101.7	102.6	61.0	56.0	77.0	101.7	102.6	61.0	56.0	77.0	101.7	102.6		
19	7.3	1.223	1.240	7.3	1.302	1.255	7.3	6.835	6.591	3.1	3.1	3.1	1.5	6.8	8.6	1.5	1.5	8.1	110.5	882.0	23.1	23.1	23.1	110.5	882.0	23.1	23.1	23.1	110.5	882.0			
20	12.0	1.07	99	12.0	1	1	1.07	97	11.6	692	683	1.9	1.9	1.9	1.0	4.1	7.0	2.1	6.9	101.7	101.7	29.2	31.0	34.7	101.7	101.7	29.2	31.0	34.7	101.7	101.7		
21	6.7	2.991	2.707	6.6	3.047	2.850	6.6	16.348	15.238	8.0	8.0	8.0	100.9	100.9	100.9	100.9	100.9	100.9	100.9	100.9	100.9	100.9	100.9	100.9	100.9	100.9	100.9	100.9	100.9	100.9			
22	1.3	31	31	1.3	31	31	1.3	31	31	1.3	31	31	1.3	31	31	1.3	31	31	1.3	31	31	1.3	31	31	1.3	31	31	1.3	31	31	1.3	31	31

## Railroad Administration Operating Statistics

### The First Attempt at a Standard Scientific Set of Operating Statistics Permitting Comparisons Between Roads

THE DIVISION OF OPERATION of the Railroad Administration undertook to devise a series of reports to be made by the individual roads under government control, which would form the basis of control by the regional directors, and of judgment of the effectiveness of this control by the central administration. This work was placed in the hands of the Operating Statistics Section of the Division of Operation, which section was in charge of W. J. Cunningham, professor of transportation, Harvard University. The monthly reports of operating statistics are on seven forms numbered OS 1 to OS 7, and relate to (1) freight train performance; (2) passenger train performance; (3) locomotive performance; (4) distribution of locomotive hours; (5) freight car performance; (6) locomotive and train costs, and (7) income account.

The great value, as well as the great defect of the statistics compiled under the direction of a general manager or director of operation of the individual road has been that the form of the statistics is designed to meet particular conditions. The value of such statistics lies in the elimination of misleading generalities, and the close application which can be made to peculiarities in operating conditions. The weakness lies in the impossibility of making accurate comparisons between two different roads, and in the impossibility, in many cases, of understanding the statistics on their face; that is, without knowing the individual peculiarities of operating conditions which they were devised to show. Furthermore, operating statistics were often continued after their usefulness had vanished; continued in a form which had been devised to meet particular but temporary conditions, and which became worthless or worse than worthless, when these temporary conditions had radically changed.

It is proposed that the Interstate Commerce Commission require the roads, after their return to private operation, to compile and forward to the commission statistics similar to these of the Operating Statistics Section. The objections to this requirement arise from a number of different causes. In

the first place, it puts a very considerable additional burden on the accounting department of many roads. If the statistics are valuable, however, in improving or keeping track of operating performances, this is not a valid objection. Another and far more serious objection is that in the mass of averages which are used in these reports, individual good and bad performances offset each other. It is argued that what the supervising office wants to know is the individual performance of locomotive 1062, with Engineman Brown and Conductor Smith in charge, with 80 cars over the up-hill district of the western division. Many roads were making daily and monthly reports which enabled the superintendent to study just these details.

If all railroad managements were as progressive and had adopted as scientific operating statistics as the Southern Pacific, the Seaboard Air Line or the Western Maryland, the setting of a standard such as is given in the operating statistics report would be of far less importance than it is. The truth is, however, that on many roads the operating statistics were perfunctory and unscientific.

The tests of whether or not a system of statistics is helpful in supervision of railroad operating results are:

Do the statistics draw attention to favorable or unfavorable changes?

Do the statistics within themselves furnish an explanation of favorable or unfavorable changes which are not the result of some extraordinary event or accident?

These tests when applied to Professor Cunningham's operating statistics show that the reports clearly indicate favorable or unfavorable changes, and these changes can be traced back to their causes in most cases. It is often said that operating statistics can be only a guide to the supervising officer as to when and from whom to demand an explanation. These Railroad Administration statistics do more than that. They furnish at least a partial explanation within themselves. They are a big step forward in the science of control of railroad operations through uniform operating statistics.



## The Railroad Administration's Improvement Program

### A Review of the Construction Progress Made During the Period of Government Management

ONE IMPORTANT FEATURE of the Railroad Administration's activities has been that relating to the expenditures for additions, betterments and extensions. Up to September 30, 1919, the total charges to capital account for this purpose for Class I roads, exclusive of that for equipment ordered by the Administration, was \$721,528,680. Of this amount \$457,776,347 was spent in 1918, so it is safe to say that the total for 1919 will be considerably smaller. Large as these expenditures appear when it is considered that they were directed by a single agency, it should be noted that the capital appropriation in 1918 is not as great as the total of the sums appropriated individually by the roads in 1917, when the capital charge for additions, betterments and extensions was \$571,746,523 (for Class I and Class II roads).

The discussion following in regard to capital expenditures by the Railroad Administration is restricted to that portion of it relating to additions to the fixed property, that is, exclusive of equipment. Expenditures for this purpose on Class I roads from January 1, 1918, to September 30, 1919, amounted to \$448,040,911 for additions and betterments and \$25,928,064 for the construction of extensions, branches and other new lines. The problem encountered in the centralized expenditure of these large sums, the manner in which the work was carried out, and the results secured, constitute an interesting chapter of the story of government management of the American railroads and a review of this undertaking is presented below.

The improvements represented by the expenditures for additions and betterments given above were undertaken in a desperate effort to increase the traffic-handling capacity of the railroads of this country as a war machine, after President Wilson had concluded, late in December, 1917, that this end could be best accomplished by centralizing the management of the roads under a government agency. The character of the improvements authorized was influenced to a large degree by the evidences of inadequacy demonstrated in the course of the memorable traffic blockades occurring in such rapid succession during 1916, 1917 and 1918, as to constitute one long-drawn-out congestion.

Having decided to operate the roads, it was but a short step to undertake the administration of capital expenditures also. In fact, the war conditions offered as many arguments for the one as for the other. With the enormous demands being made for capital for all manner of war purposes, it would have been extremely difficult for many of the roads to have raised sufficient

money to carry on the necessary improvements. In the second place, war conditions demanded the restriction of capital expenditures entirely to such projects as were deemed necessary for the winning of the war, and, third, the establishment of priorities with respect to the limited quantities of material available was more readily administered by a centralized authority. The same principle applied also to labor, but was never put into effective practice.

The authorization of such enormous expenditures and

**A**UTHORIZATIONS by the Division of Capital Expenditures during the two years of government control have aggregated \$676,684,763 for additions and betterments (exclusive of equipment) and \$47,576,573 for extensions.

Obstacles to the expeditious prosecution of the work permitted the expenditure of only \$448,040,911 for additions and betterments and \$25,928,064 for extensions up to September 30, 1919.

During 1918 work was delayed by war conditions; in 1919 by financial difficulties.



supervision of the work thus approved by one centralized authority represented a herculean task and required the creation of a special bureau organized especially for this work. The Division of Capital Expenditures was created in March, 1918, under the direction of Judge R. S. Lovett, chairman of the board of the Union Pacific, who had been serving for some time as chairman of the Priorities Committee of the War Industries Board. Judge Lovett appointed E. E. Adams, consulting engineer, and F. W. Sercombe, assistant controller, of the Union Pacific System, as his assistants. The work of this organization was supplemented by a committee headed by Francis Lee Stuart, consulting engineer, which passed on technical phases of the required additions and betterments. The activities of this committee was limited largely to the Eastern and Allegheny regions, where improvements were undertaken on the most intensive scale.

### What the Work Involved

The nature of the work authorized to be carried on under the direction of the Railroad Administration is indicated by the table of capital expenditures on Class I roads:

water stations, shop buildings, engine houses, shop machinery and tools, and power plants.

The rule governing the decision to approve or disapprove work was the same in most cases. To justify undertaking a project, its completion must effect a real addition to the traffic-carrying capacity of the roads. In cases of work on which the roads had already invested considerable capital, some weight was given to the possible loss entailed in consequence of delay in its completion. Under this exception the roads were permitted to complete, or carry to a state of partial completion, such work as track elevation, passenger stations, grade revision, and a few new lines and extensions that were already under construction, but practically no new work of a similar nature was authorized. In the case of large passenger terminal projects in the course of construction the practice varied. Work on the stations at Jacksonville, Fla., and Richmond, Va., was permitted to proceed to completion. Similar passenger terminal improvements at Indianapolis, consisting primarily of grade separation, were allowed to go on, but the Chicago and St. Paul union station projects were suspended until after the signing of the armistice.

AUTHORIZATIONS AND EXPENDITURES IN CONNECTION WITH WORK CHARGEABLE TO CAPITAL ACCOUNT FROM JANUARY 1, 1918, TO SEPTEMBER 30, 1919, INCLUSIVE, FOR CLASS I RAILROADS BY CLASSES OF WORK

Class of Work	Estimated Cost of Work Authorized			Deduct unexpended balances as of June 30, 1919, for work completed or deferred	Estimated cost of work authorized in effect September 30, 1919	Expenditures		
	During year 1918	From January 1 to September 30, 1919	Total, January 1, 1918, to September 30, 1919			During year 1918	From January 1, to September 30, 1919	Total, January 1, 1918, to September 30, 1919
<b>Additions and Betterments (Existing Lines)</b>								
Widening cuts and fills, filling trestles, etc.	\$7,570,485	\$3,947,447	\$11,517,932	\$1,636,098	\$9,881,834	\$4,190,363	\$3,652,417	\$7,842,780
Ballasting	10,115,591	4,391,551	14,507,142	3,306,465	11,200,677	4,416,469	4,036,620	8,453,089
Rails and other track material	34,645,402	23,357,669	58,003,071	3,586,447	54,416,624	15,195,237	19,897,521	35,092,758
Bridges, trestles and culverts	42,635,698	17,132,072	59,767,770	8,456,628	51,311,142	24,089,064	13,316,133	37,405,197
Tunnel and subway improvements	2,397,464	700,130	3,097,594	521,608	2,575,986	1,235,919	662,043	1,897,962
Track elevations or depressions	\$16,676,019	1,685,640	18,291,659	5,063,048	13,228,611	3,827,664	1,248,659	5,076,323
Elimination of grade crossings	12,053,906	3,787,558	15,841,464	2,028,400	13,813,064	4,361,286	2,665,448	7,026,734
Grade crossings and crossing signals	1,628,699	849,307	2,478,006	202,673	2,275,333	927,494	752,696	1,680,190
Additional main tracks	58,526,436	12,297,277	70,823,713	14,056,444	56,767,269	31,813,135	13,979,075	45,792,210
Additional yard tracks, sidings and industry tracks	122,612,008	20,759,767	143,371,775	26,202,756	117,169,019	61,296,503	30,551,448	91,847,951
Changes of grade or alignment	8,113,529	1,305,881	9,419,410	3,042,141	6,377,269	3,615,805	2,319,094	5,934,899
Signals and interlocking plants	14,558,065	2,165,973	16,724,038	2,227,827	14,496,211	6,689,059	5,439,952	12,129,011
Telegraph and telephone lines	5,769,432	1,174,747	6,944,179	679,865	6,264,294	3,048,278	2,124,808	5,173,086
Roadway machinery and tools	2,148,946	566,173	2,715,119	145,469	2,369,650	1,263,365	1,046,000	2,309,365
Section houses and other roadway buildings	3,252,771	1,375,716	4,628,487	610,048	4,018,439	1,987,967	1,440,508	3,428,475
Fences and snowsheds—right-of-way, snow or sand fences	1,874,724	777,381	2,652,105	281,480	2,370,625	953,866	834,998	1,588,864
Freight and passenger stations, office buildings and other station facilities	32,256,325	10,341,351	42,597,676	5,087,670	37,510,006	18,190,190	9,572,246	27,762,436
Hotels and restaurants	951,822	335,866	1,287,688	123,714	1,163,974	555,869	440,058	995,927
Fuel stations and appurtenances	7,962,965	2,716,480	10,679,445	753,388	9,926,057	4,402,086	3,783,906	8,185,994
Water stations and appurtenances	12,772,851	3,532,329	16,305,180	1,649,498	14,655,682	6,725,874	4,701,423	11,427,297
Shop buildings, engine houses and appurtenances	56,325,588	22,702,320	79,027,908	6,651,471	72,376,437	33,742,428	37,317,925	71,060,353
Shop machinery and tools	21,887,005	6,352,070	28,239,075	3,395,153	24,843,922	8,187,677	10,075,106	18,262,783
Electric power plants, sub-stations, transmission and distribution lines	18,472,736	4,298,328	22,771,064	1,084,364	21,686,700	7,313,101	7,606,491	14,919,592
Wharves and docks	5,652,741	1,531,497	7,184,238	2,441,019	4,743,219	1,690,622	2,014,510	3,705,132
Coal and ore wharves	5,816,271	908,631	6,724,902	561,069	5,153,933	4,654,626	685,028	5,339,656
Grain elevators and storage warehouses	2,928,970	1,711,629	4,640,599	881,845	3,758,754	1,728,891	1,582,107	3,310,998
Real estate	665,965	127,676	793,641	57,627	736,014	351,904	115,193	467,097
Assessments for public improvements	2,274,103	1,133,889	3,407,992	266,486	3,141,506	1,395,049	1,003,949	2,398,998
All other improvements	10,138,562	2,103,329	12,241,391	2,005,662	10,236,229	5,340,564	2,185,190	7,525,754
<b>Total (excluding equipment)</b>	<b>\$522,685,079</b>	<b>\$153,999,684</b>	<b>\$676,684,763</b>	<b>\$97,000,383</b>	<b>\$579,684,380</b>	<b>\$263,190,357</b>	<b>\$184,850,554</b>	<b>\$448,040,911</b>
Construction of extensions, branches and other new lines	43,007,435	4,569,138	\$47,576,573	\$11,048,254	\$36,528,319	\$17,942,615	\$7,985,449	\$25,928,064

Unfortunately, this fails to differentiate between the work initiated by the Railroad Administration and that undertaken before the government took over the railroads and to which the Administration gave its subsequent approval. Many of the roads had important work under way at the beginning of 1918, which they continued to prosecute pending the receipt of definite approval from the government or instructions to discontinue. This accounts, in a measure, for the size of some of the classes of improvements that could not be considered as war measures, as for instance freight and passenger stations, office buildings, track elevation and depression, bridges, and tunnel and subway improvements. Among the really vital items in this list may be mentioned additional main tracks, additional yard tracks and sidings, signals and interlocking, fuel stations and appurtenances,

The work of passing on all the budgets submitted to the Division of Capital Expenditures consumed a large amount of time, but the companies were notified individually of the approval of each item as soon as it was passed, so that a large amount of work was authorized before the first public statement of the Administration's betterment budget on May 18, 1918, when capital expenditures for additions and betterments and extensions to the amount of nearly \$450,000,000 was announced. This work continued throughout the year, and by December 1, 1918, capital expenditures for additions and betterments to the amount of \$507,687,414 had been approved, together with expenditures for extensions, branches and other lines to the amount of \$39,644,301.

Every effort was made to expedite the work on the projects approved, particularly those on which the urgency was the

greatest. To this end, a corps of engineering assistants on the staffs of the regional directors were detailed to make frequent inspections of the work to ascertain what progress was being made, and institute measures to overcome any causes of delay. However, events occurring in rapid succession following the signing of the armistice on November 11, 1918, soon led to a marked change in this policy.

Very early in 1919 Director General Hines found it necessary to ask Congress for an additional appropriation of \$750,000,000 to supplement the \$500,000,000 revolving fund appropriated by Congress during the previous year, which had been largely exhausted in the temporary financing of capital expenditures and in paying the deficit from operation by the Administration. These facts were brought out in hearings before Congress, and on February 21 the appropriation bill was passed by the House, but as a consequence of filibusters in the Senate the bill was stranded when Congress adjourned on March 4. The serious difficulty which confronted the Railroad Administration as a consequence was the occasion for an immediate retrenchment in both capital and operating expenditures, and Director T. C. Powell, of the Division of Capital Expenditures, who succeeded Judge Lovett in January, 1919, very shortly announced that capital expenditures for the year would have to be financed very largely by the corporations and called attention to the fact that this would make it necessary to secure the approval of the corporate officers before proceeding with any new project.

The steady increase in the deficit from operation through the first half of 1919, together with the action of Congress in cutting the appropriation from \$1,200,000,000 to \$750,000,000, when the bill was eventually passed in June, made it impossible for the Administration to alter its policy with regard to capital expenditures. For this reason only the most necessary work was authorized during 1919, but owing to the fact that there was a large holdover from work authorized during 1918, the work actually accomplished during the second year of government management did not fall far below the volume of work done during the first year.

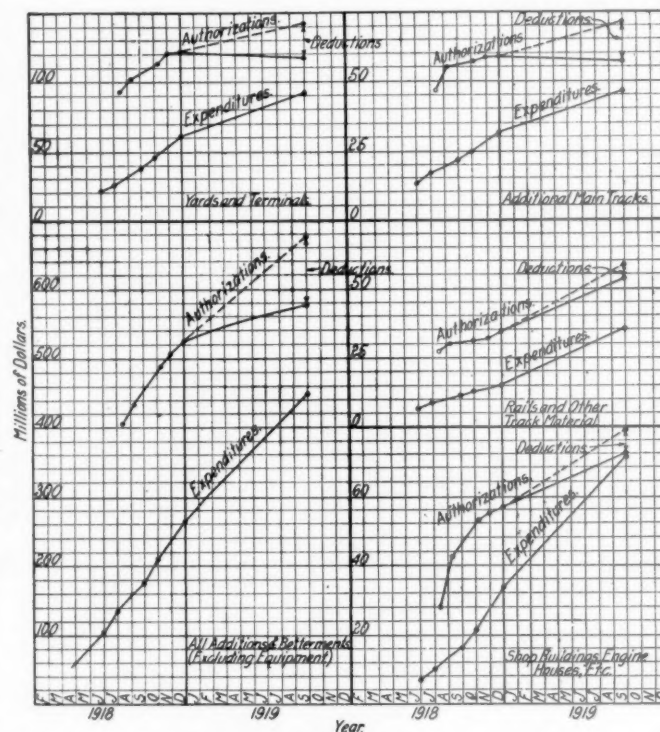
### A Study of the Progress Made

Like all other undertakings involving the use of men and materials during the war period, it was physically impossible to obtain the desired progress on the railway projects for increased facilities to the degree that would effectively ameliorate the railway congestion. Fortunately the armistice went into effect before the advent of the winter of 1918 and 1919, which in itself proved to be a very mild affair in comparison with its immediate predecessor. As given on the table, the expenditures for additions and betterments chargeable to capital account (exclusive of equipment) authorized up to January 1, 1919, for Class I roads, was \$522,685,079, but of this total only about one-half, namely \$263,190,357, was spent during that calendar year. This is illustrated effectively by the diagrams showing the expenditures and authorizations for all additions and betterments and also for several separate accounts under this head.

From these charts it is seen that during 1918 the rate at which the expenditures were authorized during the second half of the year was faster than the rate at which the work could be prosecuted. However, these charts cannot be taken to show the actual rate of completion of work. For instance, the chart on shops, engine houses, etc., indicates that more money had been spent by January 1, 1919, than was authorized on August 15, 1918, but this does not indicate that all of the work authorized on August 15 had been completed by January 1, since the amount spent on that date included considerable sums for work authorized later than August 15. As a matter of fact, through familiarity with a large number of these projects it is known that practically the only large engine terminals actually completed and ready for use in the winter of 1918 and 1919 were such as had been started

or on which preliminary work was well in hand prior to the advent of government control.

The portions of the charts covering the second year of government control also bring out several pertinent points. First, that a considerable amount of additional work, other than that held over, was authorized; second, that much work was later deferred, and, third, that there is a considerable holdover for 1920. The grand total of authorizations for Class I roads chargeable to capital account was \$676,684,763 on September 30, 1919. This was reduced by deductions for unexpended portions of work completed or deferred to \$579,684,380. The total expenditure from January 1, 1918, to September 30, 1919, was \$448,040,911. The charge for engine terminals and shops indicates a more complete fulfillment of the program than is warranted by the facts. It



Relation of Progress in Authorizations and Expenditures on Additions and Betterments

would appear that only about \$3,000,000 worth of work remains to be finished, but actually there was a total on September 30 of \$12,396,226 of authorizations in excess of expenditures, which is balanced by expenditures in excess of authorization of \$9,275,658. Notwithstanding this, the showing is very much better than for the accounts covering yards and terminals and additional tracks. The appropriation for extensions, branches and new lines amounted to \$47,576,573, of which \$11,048,254 was eventually deducted. Expenditures to September 30 amounted to only \$25,928,064, leaving an unexpended balance of \$12,899,658.

Taking into consideration the magnitude of the task and the serious obstacles to expeditious prosecution of the work prevailing during the war period, and later in 1919 due to failure of Congress to make needed appropriations, the progress made in additions and betterments is highly creditable not only to the officers of the Division of Capital Expenditures but also to the railway engineering officers who were directly responsible for the actual work done. It must be recalled in this connection that railway construction work during the war period was carried on in direct competition with a large amount of other government construction projects, and, while much of the other government construction work was conducted with a seeming disregard for all considerations of economy, the railway work was generally prosecuted with commendable conservatism.

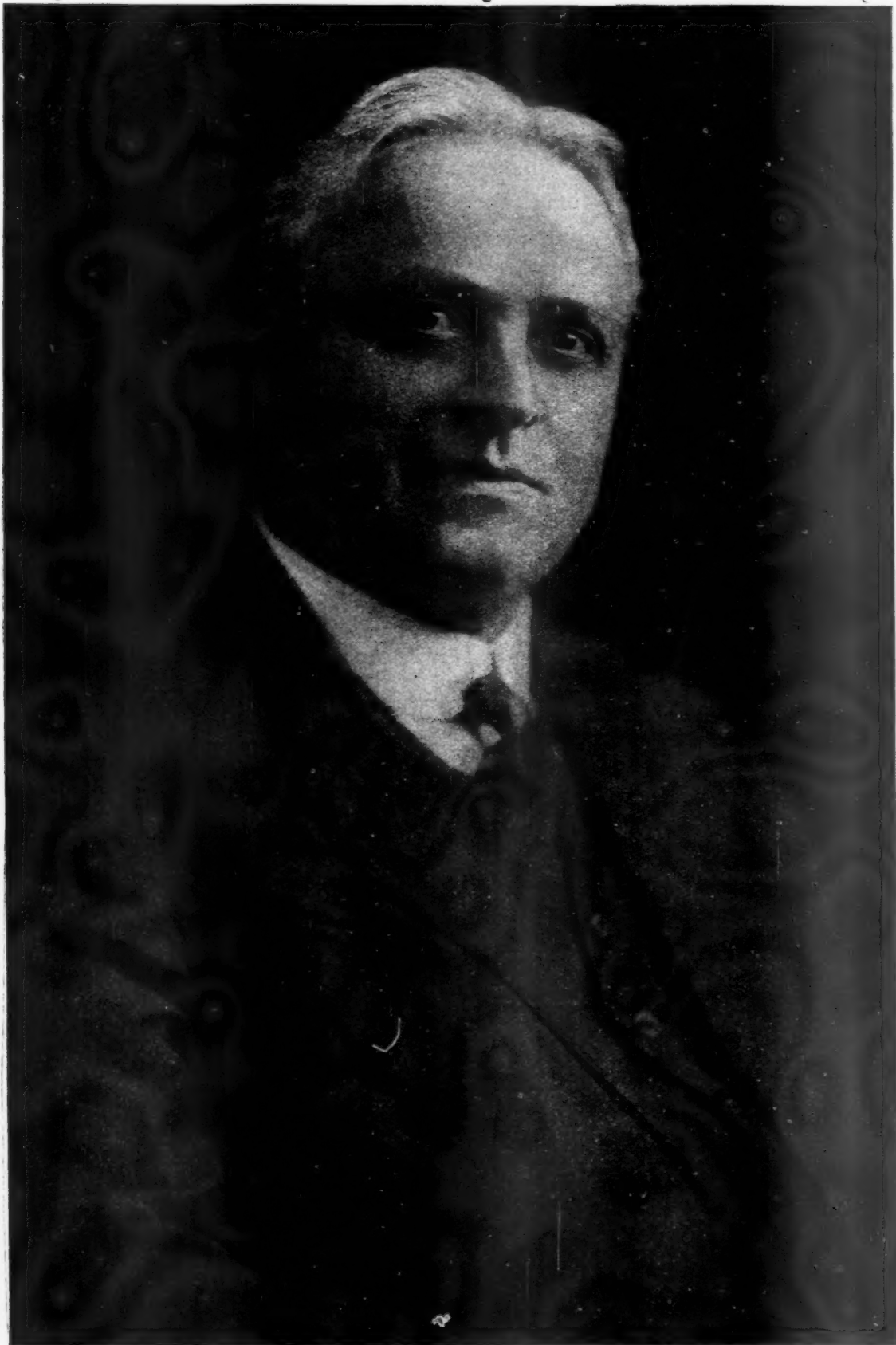


# Statistics of the Railways in 1919

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Detail Studies of the Progress  
Made by the Railroads of This Country  
Last Year

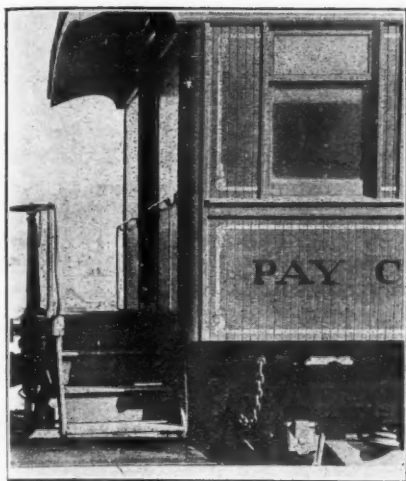
Comparison with Previous Years  
General Reviews of the Canadian and British  
Railway Situation



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**Hon. John J. Esch of Wisconsin, Chairman of the House Committee on Interstate and Foreign Commerce**

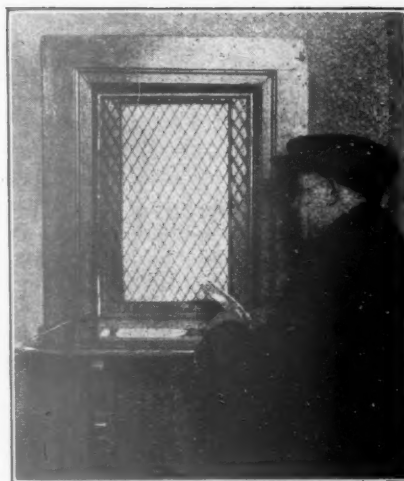




# Railway Revenues and Expenses in 1919

Net Federal Income  
Estimated at Approximately  
\$400,000,000 Less  
Than Government Guarantee

By Julius H. Parmelee



**L**IKE ITS IMMEDIATE PREDECESSOR, the year 1919 is with difficulty placed in its true relationship to normal railway operation. The bulk of our railway mileage continued in the hands of the federal government, whose control over railway operation has extended into every phase of railroad activity. Furthermore, wages and other costs continued to rise as in 1918, a rise which the increased freight and passenger rates, in effect during the whole of the year just closed, did not prove sufficient to offset. With passenger and freight rates from 11 to 13 per cent higher than the average of 1918, yet the deficit under the government guarantee to be made up out of the public treasury was at least \$150,000,000 greater than in 1918. That is, the total deficit will approximate \$400,000,000 for 1919, as compared with a deficit of \$236,000,000 in 1918.

What were the outstanding facts of the year? Both revenues and expenses broke the record, freight traffic was about nine per cent less than in 1918, passenger traffic about six per cent greater, and the deficit three-fourths greater. The aggregate deficit for two years of government operation will approximate \$650,000,000.

## Revenues

Revenues of Class I railways passed the five billion mark by 175 million dollars. Through October they stood at \$4,293,000,000, or a quarter of a million dollars greater than in 1918, which was the previous ten months' record. For the year as a whole, revenues were about \$260,000,000, or 5 per cent greater than in 1918, and \$1,780,000,000, or 52 per cent greater than the annual average of the test period.

Freight revenue for 10 months amounted to \$2,950,000,000. For the year, I estimate a total of \$3,550,000,000, which was \$100,000,000 more than in 1918 (in spite of a freight traffic less than in 1918 by nine per cent), and \$1,170,000,000, or about 50 per cent, greater than during the test period. In fact, the freight revenue alone for 1919 was greater than the average annual total revenues from all sources of operation during the test period, and almost equal to the total revenues of the year 1916.

The same analysis applies to the revenue from passenger

business. Passenger revenue for 10 months amounted to \$986,000,000. For the year my estimate is \$1,200,000,000, which is about \$170,000,000 greater than in 1918, and \$510,000,000, or nearly three-fourths, greater than during the test period.

Other revenues, including receipts from mail, express, and other sources, amounted in 10 months to \$357,000,000, or slightly less than in 1918. This indicates a total for the year of about \$425,000,000.

These revenue returns are presented in tabular form below. The statistics are based on complete returns for the ten months to October 31, and on incomplete data for November and December. Although several complicating factors entered into the railway situation in those two months (such as the coal and steel strikes), it seems probable that revenues as a whole were at about the same level as during the corresponding months of 1918. Some railways lost heavily in revenue, while others gained; the net result will show but slight change.

## RAILWAYS OF CLASS I.

	1919
Freight revenue.....	\$3,550,000,000
Passenger revenue.....	1,200,000,000
Other operating revenue..	425,000,000
Total operating revenue	\$5,175,000,000

The monthly percentage of increase or decrease in the several revenue accounts, compared with 1918, is shown in Chart I.

## Expenses

As to operating expenses, they also stood at record height in 1919. Through the first 10 months they amounted to \$3,615,000,000; for the year as a whole they approximated \$4,375,000,000, which was \$368,000,000, or 9.2 per cent, greater than in 1918, and \$2,078,000,000, or 90 per cent, greater than the annual average of the test period.

To get an adequate perspective on expenses, it should be recalled that railway operating expenses were slowly growing each year up to and including 1916; that in 1917 the first effects of the rising level of prices began to be felt; that in 1918 the increased wages made effective by the Railroad Administration, together with the increased cost of material and supplies, jumped the expenses of that year more than

**W**ITH PASSENGER and freight rates 11 to 13 per cent higher in 1919 the estimated government deficit exceeds that of the year 1918.

Revenues 5.3 per cent greater, expenses 9.2 per cent greater and net operating income 17.4 per cent less than in previous year.

The railways earned 63 per cent of guarantee.

The aggregate loss to the government for the two years was between \$625,000,000 and \$650,000,000.

40 per cent; that the trend of rising wages and costs in 1919, while not so great as in 1918, yet continued at a marked rate.

To indicate the detailed facts underlying these statements, it may be instanced that expenses in 1916 were nearly 17 per cent greater than in 1915, the increase being more or less fully accounted for by increased traffic; that expenses in 1917 were about 20 per cent greater than in 1916, whereas traffic increased at only half that rate, or about 10 per cent; that expenses in 1918 were more than 40 per cent greater than in 1917, whereas traffic increased less than 5 per cent. For 1919, the record shows that expenses were greater than in 1918 by about 9 per cent, whereas traffic actually declined as compared with the previous year, passenger traffic showing an increase, which was more than offset by the decrease in freight traffic.

In other words, the increased expenses of 1916 were explained by growth of traffic, about half the increase of 1917 was due to increased traffic, while about one-eighth of the increase in expenses in 1918, and none of the increase in 1919, was due to the traffic factor. The last two clauses tell the story of the financial difficulties in which the Railroad Administration has found itself since January 1, 1918: wage increases and other increasing costs have been running far ahead of growth of traffic, and also ahead of efforts to meet the increased cost of operation by means of increased rates.

Operating expenses as a whole were 9.2 per cent greater in 1919 than in 1918. The greatest increase in any one principal account was in maintenance of way, which in-

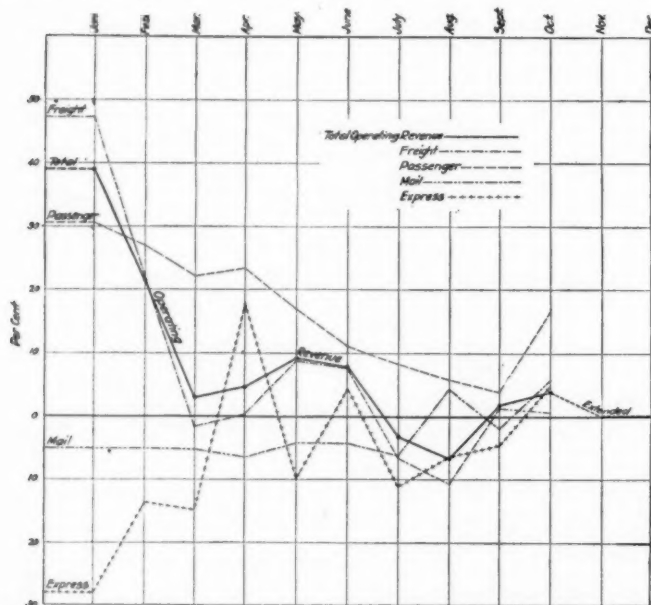


Chart I—Rate of Increase or Decrease of General Revenue Accounts by Months, 1919, Compared With 1918

creased 20 per cent; next in general expenses, which increased 11.6 per cent; maintenance of equipment increased nearly 10 per cent, and transportation increased more than 5 per cent.

Traffic expenses, which fell off one-quarter in 1918 as compared with 1917, continued to decrease in 1919, falling between 7 and 8 per cent.

The amounts represented by these various expense accounts in 1919 were as follows:

Maintenance of way.....	\$782,500,000
Maintenance of equipment.....	1,215,000,000
Traffic .....	45,000,000
Transportation .....	2,165,000,000
General .....	125,000,000
All other .....	42,500,000
Total operating expenses.....	\$4,375,000,000

Chart II shows the monthly percentage of increase or decrease in the various expense accounts, as compared with 1918.

Taxes were slightly greater than in 1918, or about \$190,000,000. With due allowance for the items of hire of equipment, joint facility rentals, and uncollectible revenue, the income account of roads of Class I for 1919 (November and December partially estimated), as compared with 1918, is as follows:

Item	1919	1918	Increase or decrease	
			Amount	Per cent
Operating revenues.....	\$5,175,000,000	\$4,913,319,000	\$261,681,000	5.3
Operating expenses.....	4,375,000,000	4,006,894,000	368,106,000	9.2
Net revenue.....	800,000,000	906,425,000	d 106,425,000	d 11.7
Taxes .....	190,000,000	186,652,000	3,348,000	1.8
Equipment rentals, etc....	Dr 40,000,000	Dr 29,354,000	d 10,646,000	d 36.3
Net operating income....	\$570,000,000	\$690,419,000	d \$120,419,000	d 17.4
Ton-miles (millions)....	398,000	435,000	d 37,000	d 8.5
Passgr. miles (millions)...	45,000	42,606	2,394	5.6

From this showing it appears that the net operating income, corresponding to the standard return of \$905,000,000

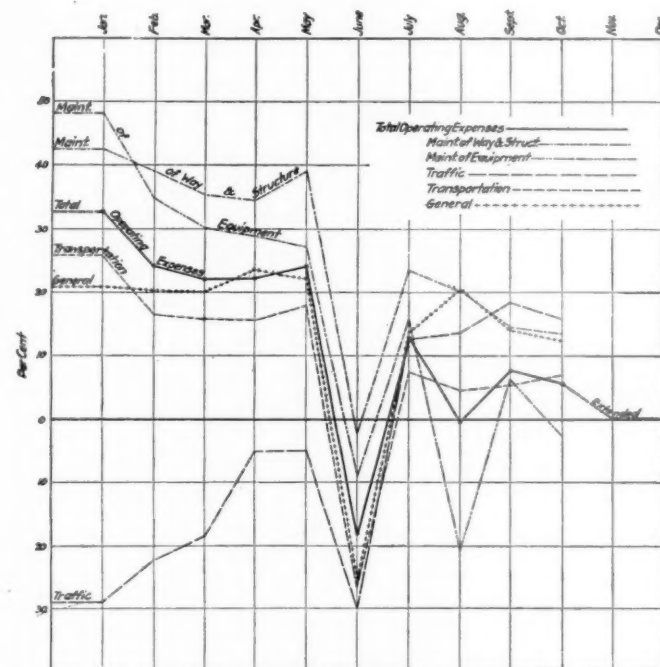


Chart II—Rate of Increase or Decrease of General Expense Accounts by Months, 1919, Compared With 1918

guaranteed to Class I railways by the federal government, was \$570,000,000 in 1919, or \$335,000,000 less than the guarantee. In other words, the railways earned only 63 per cent of their guarantee in 1919. This net operating income for 1919 was less than in 1918 by \$120,000,000, or 17.4 per cent.

Turning for a moment to a comparison of the results of 1919 with those for the average year of the three-year test period (1915-1916-1917), we find that revenues, expenses, net income, and traffic for the two periods were as follows:

Item	1919	Test period average	Increase or decrease	
			Amount	Per cent
Operating revenues.....	\$5,175,000,000	\$3,395,231,000	\$1,779,769,000	52.4
Operating expenses.....	4,375,000,000	2,297,162,000	2,077,838,000	90.5
Net revenue .....	800,000,000	1,098,069,000	d 298,069,000	d 27.1
Taxes .....	190,000,000	152,427,000	37,573,000	24.6
Equipment rentals, etc....	Dr 40,000,000	Dr 40,482,000	482,000	1.2
Net operating income....	\$570,000,000	\$905,160,000	d \$335,160,000	d 37.1
Ton-miles (millions)....	398,000	363,500	34,500	9.5
Passgr. miles (millions)...	45,000	34,286	10,714	31.2

A large part of the increased revenue was due to increased rates, and a part also to increased traffic. How great these two factors have been will appear from a scrutiny of the



trend in freight and passenger revenues. Freight revenue was greater than during the test period by \$1,170,000,000, while passenger revenue was greater by \$510,000,000. The freight traffic of 1919 was nearly one-tenth greater than that of the test period, while the freight revenue was greater by about one-half. It follows that one-fourth of the increased freight revenue of 1919 was due to increased freight traffic (transported, of course, at the higher rates) and some three-fourths to increased rates. Of the \$1,170,000, then, \$290,000,000 represents increase in traffic over the test period, and \$880,000,000 increased rates. Passenger traffic in 1919 ran consistently about thirty per cent greater than during

some electric railways, a number of water carriers and inland waterways, is guaranteeing the net income of the express companies, and is itself spending several millions a year for expenses of administration in the maintenance of the central Washington office and the regional offices of the United States Railroad Administration.

For example, the deficit shown above for railways of Class I in 1918 is \$214,581,000. The total deficit for 1918, all operations, has been reported by Director General Hines as \$236,184,040, or about twenty-one and a half millions greater than the deficit on Class I operations alone. The director general's statement is so illuminating that it is worth reproducing in condensed form below:

Deficits	Year 1918
Steam railways .....	\$216,328,314
Sleeping car line.....	4,597,503
Water carriers and waterways.....	3,829,090
Express company (from July 1).....	9,500,000
Expenses, U. S. R. R. Adm.....	3,647,143
	<b>\$237,902,050</b>
Credits	
Electric Rys. surplus (7 roads).....	319,232
Miscellaneous net Crs. (bnk. int., etc.).....	1,398,778
Total net deficit for 1918.....	<b>\$236,184,040</b>

Corresponding statistics for 1919 are not available as this article is written, but it is clear that with a deficit of \$335,000,000 from the operation of railways of Class I, the total net deficit of the Railroad Administration for the year will

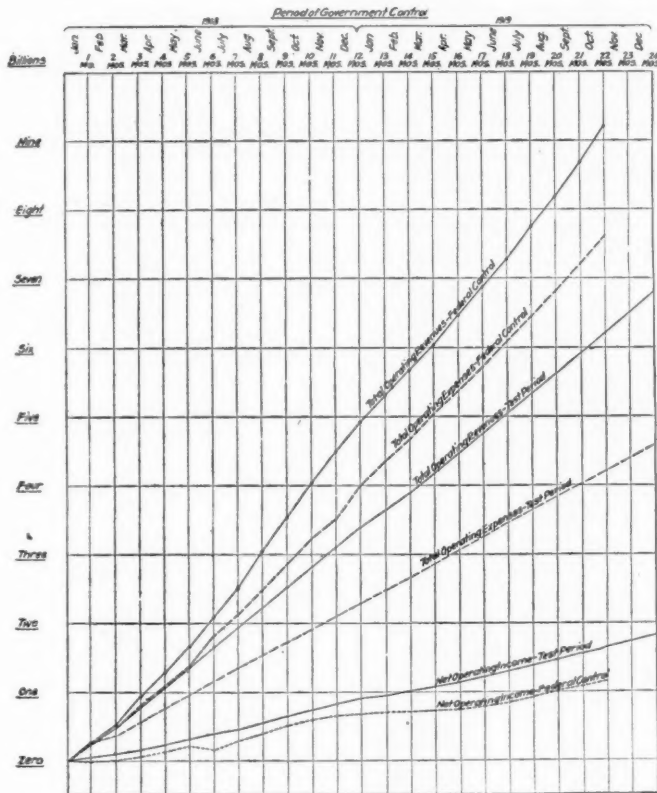


Chart III—Cumulative Revenues, Expenses, and Net Operating Income, Period of Federal Control (1918-1919) Compared with Test Period

the test period. If traffic was three-tenths greater, and revenues were three-fourths greater, it follows that about six-elevenths of the increased passenger revenue in 1919 was due to increased traffic, while the remaining five-elevenths was due to increase in rates. The amounts are respectively \$280,000,000 and \$230,000,000.

Operating expenses were 90 per cent greater than during the test period (compared with increased revenues of 52 per cent), and taxes were one-fourth greater. Freight traffic increased 9.5 per cent, and passenger traffic 31.2 per cent.

#### Deficit to Be Made Up from Public Treasury

For the two years of government control and operation the total deficit from the operation of Class I railways, to be made up out of the public treasury, is as follows:

	1919	1918	Two-years
Standard return .....	\$905,000,000	\$905,000,000	\$1,810,000,000
Net operating income.....	570,000,000	690,419,000	1,260,419,000
Deficit .....	<b>\$335,000,000</b>	<b>\$214,581,000</b>	<b>\$549,581,000</b>

This table indicates a total deficit for the two-year period, for railways of Class I, of nearly \$550,000,000. Unfortunately, this is not the whole story, for the government is operating many smaller railways, the Pullman company,

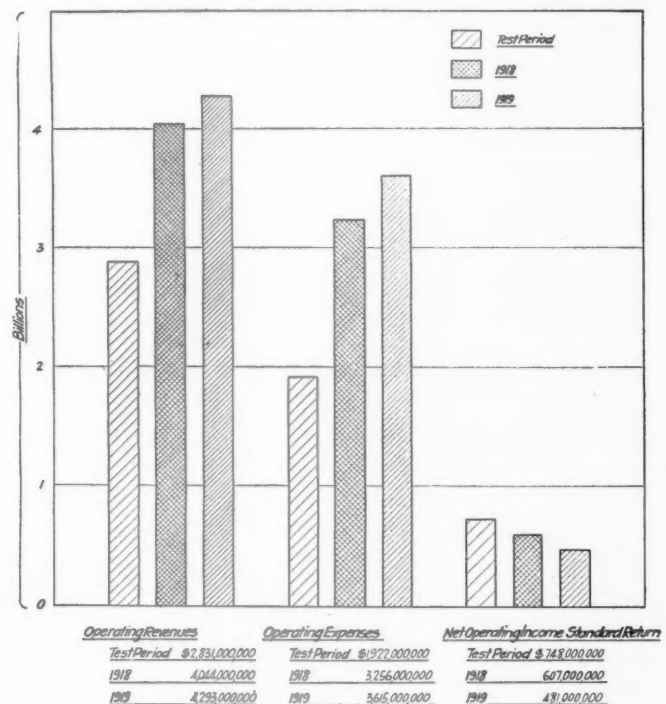


Chart IV—Revenues, Expenses and Net Operating Income for Ten Months to October, 1919, Compared With 1918 and Ten-Twelfths of the Test Period

approach, and in all probability surpass, \$400,000,000. This will place the aggregate deficit for the two years somewhere between \$625,000,000 and \$650,000,000, a total which makes no allowance for possible credits or debits that may arise out of the adjustment of claims for under- or over-maintenance, the status of the material and supply account, loss and damage accounts, claims made by short-line railroads on account of diverted traffic, and other items not now ascertainable.

In this connection, it is of interest to quote from the report filed by Senator Cummins when he introduced Senate Bill No. 3288 (the Cummins Bill) on November 10:

"According to the estimate of the Railroad Administration, the net operating income of the systems in the hands of the government for the two years 1918 and 1918, will be \$551,777,459 less than the compensation to which the carriers are entitled, computed as provided in the law and as prescribed in the standard contract; that is to say, when all accounts have been adjusted and paid the government will have lost that amount in its two years of operation. It is the opinion of the committee, without reflecting in any wise upon the Railroad Administration, that in the end the loss will be found to be much greater than the estimate submitted; but, however that may be, it must ultimately be paid from the treasury of the United States."

At a later point in the report, Senator Cummins proceeds on the assumption "that the government's loss for the two years will be, in round numbers, \$600,000,000."

Chart III gives the cumulative revenues, expenses, and net operating income (in billions of dollars) of railways of Class I during the two years of federal operation, as compared with the test period. The striking feature of the chart is that the *expenses* of federal operation have almost consistently surpassed the *revenues* of the test period, whereas the net operating income has been consistently less.

Chart IV makes the same showing by years; the average year of the test period, the year 1918, and the year 1919. To facilitate exact comparison, the figures are for the ten months to October 31 of each year. The revenues and expenses have progressively increased; the net operating income has progressively declined.

#### Reasons for Increases

We proceed now to an analysis of the reasons why the revenues and expenses of 1919 showed the increases over corresponding accounts for 1918 indicated in the foregoing paragraphs.

First, as to revenues. It has already appeared, from the preceding discussion, that freight revenue in 1919 increased \$100,000,000 over 1918, and passenger revenue \$170,000,000, with a small decrease in the other revenue accounts.

The increase in total operating revenues was \$262,000,000. As compared with 1918, freight traffic fell off about 9 per cent, so that increased rates were responsible both for making up the decrease in traffic and for the increase of \$100,000,000 in freight revenue. The total amount assignable in 1919 to increased rates was about \$400,000,000, or about 13 per cent. There was no general increase in freight rates during 1919, although many rate adjustments were made that in the aggregate had an upward tendency, but as the general increase of 1918 was in effect only half the year, the average for the whole of 1919 was clearly greater than the average for the whole of 1918.

The increase of \$170,000,000 in passenger revenue, as compared with 1918, was due partly to increased rates and partly to increased traffic. Passenger-miles increased six per cent over 1918. Combining these two factors in their proper relationship, we find that about two-fifths of the \$170,000,000, or about \$68,000,000, was due to increased traffic and the balance, or \$102,000,000 to increased rates.

It will be remembered that the increased passenger rates of 1918 were effective only from June 10, and that the full effect of the increase was therefore not reflected in the passenger revenue totals for that year.

"All other revenue" is composed of mail revenue, express revenue, and a number of miscellaneous revenue accounts. Mail revenue showed a mournful tendency to decrease, in spite of the fact that the railways were handling no less mail in 1919 than in 1918. In fact, the Postmaster General reported for the fiscal year ended June 30, 1919, that the record business of 1918 had continued during the year 1919. Yet the mail revenue for the first 10 months of 1919 was less than for the same period of 1918 by 2.8 per cent. The Postmaster General, describing the "scientific and busi-

nesslike method of railway mail pay," which he claims was installed as a result of his own active championship, states that this method "enables the department to pay for what it receives and the railroads to receive what they earn, which was not possible under the old system." Under the practical workings of the method, which has been vigorously protested by the railways, postal revenues in 1919 appreciably increased, whereas railway mail pay, or revenue received by the railways for transporting the increased mail traffic, showed a decrease.

Express revenue also decreased. For 10 months the decrease was nearly \$6,000,000, or 5.7 per cent. This was in spite of increased express rates, in the benefits of which the railways of course had a share, and indicates the serious falling off in express business that took place in 1919.

Miscellaneous revenues other than mail and express showed slight increases in the aggregate.

It is, however, when we turn to the operating expense accounts that the startling nature of changes during 1919 makes itself apparent. Total expenses increased \$368,000,000, or about nine per cent. The question at once arises as to what proportion of the \$368,000,000 represented wages and what represented the cost of materials, supplies, etc.

#### Wages

As to wages, three factors enter into a comparison of payrolls for two periods. One is the number of men at work, the second is the number of hours or days per man, and the third is the rate of pay per hour or per day. The second factor multiplied by the third gives earnings per employee, and this multiplied by the number of men gives the total payroll.

Now in 1918, according to Director General Hines, the total payroll of railways of Class I under federal control was \$2,593,000,000, of which \$583,552,000 represented increased wages made effective during the year. Inasmuch as only part of the increases dated back to the first of the year, it is evident that the \$583,552,000 did not reflect the full effect of all the 1918 increases, computed on an annual basis. While the exact effect of the 1918 increases cannot be stated, it is generally estimated as approximating \$900,000,000 a year. Several additional general increases were made in 1919, which again will not be fully reflected in the 1919 payroll, but which are expected to aggregate about \$150,000,000, as follows:

Trainmen in January (to complete the "war cycle")	...	\$60,000,000
Police, dining car employees, etc.	.....	5,000,000
Shopmen (from May 1)	.....	50,000,000
Trainmen (from Dec. 1)	.....	36,000,000
Total	.....	\$151,000,000

This amount, approximating \$150,000,000, would seem to bring the total wage increases up to or above a billion dollars a year. Certain wage tables submitted by Director General Hines to the Senate in November, in response to a resolution of that body, show that between December, 1917, and July, 1919, the payroll increased from \$153,039,988 to \$226,140,935. This was an increase of \$73,000,000 a month, or something less than \$900,000,000 annually. The increase is due in part to the greater number of men on the payroll. On the other hand, the figures do not include the agreement with maintenance of way employees, effective December 16, 1919, nor smaller adjustments made in the wage scales of many subsidiary groups of employees; furthermore, they cover only in part the 1919 increases listed above. It is impossible to give proper weight to all these factors, but to say that wages have risen a billion dollars a year does not appear far from the actual facts of the case.

The director general's tables show, further, that with the increase in number of men, the average number of hours per day, or standard days per month, had decreased since 1917. The net result to the average employee, as shown in his pay envelope each month, was an increase in annual



earnings from \$1,004 in 1917 to \$1,433 in 1919 (July basis), a rise of 42.7 per cent.

Other costs than wages have also increased, driven upward by the inexorable trend of rising prices. The Railroad Administration reports that coal prices for the first nine months of 1919 were \$3.45 per ton (including rail haul), as compared with \$3.25 in 1918. This increase of 20 cents per ton, when applied to 150,000,000 tons, represents \$30,000,000 in money; the chances are that the total will prove to have been much increased by the coal strike and the necessity that devolved on the railways of confiscating coal at high prices; this is entirely apart from the increased price of coal that may grow out of the strike settlement. Other materials than coal also suffered increases in 1919, although it is difficult to show exact amounts for each article.

In brief, it is next to impossible to ascertain what proportion of the \$368,000,000 of increased expenses went to labor, and what proportion was absorbed by material costs. That the bulk of it, however, must have gone into the payroll is the inevitable conclusion, when one considers that the number of railway employees in 1919 was increasing, that their average earnings were growing, and that the 1918 wage increases did not become fully effective until 1919.

Normal taxes payable by the director general under the standard contract were about the same in 1919 as in 1918, but corporate taxes, which the railways must pay out of their own net income, and which includes the bulk of the special war taxes, were greater in 1919 than in 1918. They approximated \$40,000,000 for Class I railways in 1918.

Finally, what is the outlook for the future? We have seen that for 1919 the net operating income of Class I railways was some \$335,000,000, or nearly a million dollars a day, less than the standard return, without any allowance for additional return on money invested in railway property since July 1, 1917. Whatever may be the added efficiency of private operation, will it be offset by a deliberate campaign on the part of railway labor to bring about government ownership? There are possibilities in the situation that might easily add a tinge of pessimism to any forecast. At best, to require the railway industry to re-shoulder its burden of operation with a \$335,000,000 deficit as an additional handicap is asking almost too much of human energy, no matter how willing or capable it may be. A horizontal increase in freight rates would assist the problem, but will such an increase be authorized quickly enough to save the bulk of the railway companies from bankruptcy?

If a larger traffic be assumed for 1920 than was handled in 1919, that would help solve the problem, provided the factor of labor and the factor of public opinion mutually determine to give private railway operation a fighting chance—the American square deal to which it is certainly entitled.

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Photo from International

On the Mexican Border, Where Extensive Improvements Are Too Likely to Attract Bandit Raids

## The Oakland Mole

**T**HE OAKLAND (Cal.) Mole, western terminus at the present time of the Southern Pacific, the Atchison, Topeka & Santa Fe and the Western Pacific, handles approximately 90 steam trains and 677 electric trains in and out every day, according to an article written by D. A. Porter, division engineer of the Western division of the Southern Pacific in the "Southern Pacific Bulletin." The average number of switching movements made within the limits of the Oakland Pier tower is 1,900 and under emergency conditions has reached 2,100—from 79 to 83 switching movements an hour, or over one a minute.

The 90 steam passenger trains comprise over 650 cars. The total number of passengers handled, according to Mr. Porter, averages 12,000 daily and the total number of passengers across the Bay of San Francisco via the Oakland Mole is estimated at 55,000 daily.

In addition Mr. Porter's article contained the following description of the facilities for handling freight on the Mole:

"The new freight slips are located on the south side of the mole. The present facilities consist of three units or wharves which are driven at an angle with the bulkhead line and are respectively 100 ft., 70 ft. and 75 ft. wide and each 875 ft. long. The completed work requires the use of nearly 5,000 piles and over a million and a half feet of lumber. Over three-quarters of a million cubic yards of dirt was removed to give the proper depth of water for berthing vessels.

"On Dock No. 1 is located a warehouse 80 x 380 ft. in size with a floor space of over 30,000 sq. ft.

"This shed is served by two depressed tracks down the center so that cargoes may be wheeled directly from sling to car. The entire side is made of sliding doors so that any portion can be reached conveniently. Night loading is facilitated by excellent lighting arrangements.

"Fifty vessels a month carrying lumber are unloaded at these wharves, carrying from 75,000 to 500,000 ft. of lumber. Tracks are so arranged on the lumber wharves that transfer may be made direct from boat to car. An average of 200 carloads a month, including all classes of freight, is received or shipped over these wharves. The facility with which lumber may be handled here is illustrated by the fact that one boat unloaded 155,000 feet of lumber in two hours."

"**SWITCHMANSHIP.**"—Big men nowadays tell us that to succeed we must be a good salesman and that we must sell something that we believe in and something that the buyer will not have to put on the shelf or sell at a sacrifice. What has a switchman to sell? A switchman sells his labor at so much an hour. He must sell his employer the best he has so that his employer can sell transportation. If the employer does not sell good transportation there is no business on the road and both switchman and employer suffer. Suppose you want to make a change from your present location to one where the prospects for you are better. You go to your employer and tell him of your intentions. You have been a good salesman and you have always sold him something that he could use. He likes you for your honesty, so he takes you into his private office and talks to you as father to son and volunteers to write a personal letter to your future employer. If he is personally acquainted with your future employer he will make it a point to look him up and have a talk with him and do all the good he can. He is sorry to lose you, but he is willing to help you, because you helped him. You leave his office in a happy frame of mind. If you have been a poor salesman you do not get such a reception. You will go to the office and tell your employer of your intention and he will reply: "All right." He calls in his clerk and tells him to give you an order for your time and a service letter. Your service letter will be something on the order of a prison record. It will give the color of your hair and eyes, weight and height.—*Duit Wright, Illinois Central.*



## Dividend Changes on Railroad Stocks

Lehigh Valley Is the Only Important Railroad Which Made a Change in Its Regular Dividend Rate

THE SAME RENTALS were due the railroad corporations from the government for the operation of the roads in 1919 as in 1918. Since fixed charges and dividends are paid from this rental, there were no important changes in dividend rates, with the exception of the Lehigh Valley. The Lehigh Valley had been paying annual dividends at the rate of 10 per cent during the test period, and the rental from the government would have permitted a continuance of this rate, but since in the test period the dividend absorbed nearly the entire surplus of the company it was thought more conservative to reduce the rate from 10 per cent to 7 per cent in 1919.

There was a good deal of uncertainty about dividend payments by a number of the railroad companies. The situation was complicated by the fact that on the one hand the government was loaning money to the corporations for additions and betterments to their property, sometimes with the approval of the corporation and sometimes against the wishes of the corporation. At the same time the government was delaying the payment of the guaranteed rentals to the companies. Furthermore, the government was asking corporations which could use their corporate funds for additions and betterments to do so, and this left some corporations almost without corporate funds for a period of time. When, therefore, the regular dividend period came around the directors found themselves in the position of having book earnings sufficient to pay the regular dividends, but no funds immediately available. This led to the practice of declaring dividends, payable when the funds became available, and in many cases with the proviso that the dividend be approved by the Railroad Administration. This meant delayed dividends to stockholders, with a certain amount of annoyance and even hardship to stockholders wholly dependent for their living on their income from investments.

Certain dividend changes that took place in 1918 are still hanging fire, notably the cases of the Wabash preferred A stock and the Chicago, Milwaukee & St. Paul preferred. Both these stocks are investment securities, the preferred A of the Wabash representing the exchange or bonds in reor-

ganization and the preferred of the Chicago, Milwaukee & St. Paul representing what for nearly a generation was considered one of the gilt-edge railway stock investments. The corporation officers of the St. Paul and of the Wabash have continued their efforts (begun in 1918) during 1919 to reach some basis of settlement with the United States Railroad Administration. In both cases the character of the stock is such that its holders should have the utmost consideration, consistent with justice, from the Administration and from the directors of the corporation. What the outcome will be, however, is still uncertain.

### DIVIDEND CHANGES

Name of road	Per cent declared in 1919	Per cent declared in 1918	Annual rate in 1919	Annual rate in 1918
Baltimore & Ohio, Common.....	4	4½	4	4*
New York, Ontario & Western, Common....	1	2	..	..
Western Pacific R. R. Corporation, Preferred..	4	6	4	6
Western Pacific R. R. Company, Preferred..	4	6	4	6
Lehigh Valley .....	8½	10	7	10
New York, Chicago & St. Louis, 1st Preferred	None	5	..	..
New York, Chicago & St. Louis, 2d Preferred	2½	None	..	..
Albany & Susquehanna.....	12¼	9	9	9

\* The regular dividend rate was reduced from an annual 5 per cent to an annual 4 per cent in the second dividend period of 1918.

The Ogden Public Library, Ogden, Utah, is planning to establish a department of transportation history, using for this purpose a recent gift of \$8,000, representing the unexpended balance of money given by the Southern Pacific and the Union Pacific Railroad companies for the Golden Spike Celebration, held last May, in commemoration of the joining of the two roads near Ogden. The new department will include a museum containing relics of the union of the two roads and books dealing with this and other pioneer transportation events.



## FORECLOSURE SALES.

### NOTICE OF FORECLOSURE SALE PURSUANT TO ADJOURNMENT.

CHANCERY SALE.—In pursuance and by virtue of the amended decrees of foreclosure and sale in favor of The New York Trust Company, complainant, made and entered by the District Court of the United States for the Eastern District of Michigan, Southern Division, and of the District Court of the United States for the Northern District of Ohio, Western Division, and of the District Court of the United States for the Southern District of Ohio, Eastern Division, which amended decrees were dated on the 9th day of December, A. D. 1912, and entered in said Eastern District of Michigan, Southern Division, December 9, 1912, in said Northern District of Ohio, Western Division, December 12, 1912, and said Southern District of Ohio, Eastern Division, December 12, 1912, in causes pending in said respective courts, and which were entitled: The New

## FORECLOSURE SALES.

of the required deposit for a bid on the entire property.

The Court reserves the right to reject any bid, and to resell the property in respect of which the bid shall have been made or any part thereof upon failure of the purchaser to comply with any order of the Court as to payment of the remainder of the purchase price or any part thereof.

There shall be paid in cash of the price at which the said property shall be sold, in addition to the amounts paid at the time of the sale, such further portions of the purchase money as the Court shall direct. The remainder of the purchase money may be paid as follows:

Upon a sale of the Ohio Southern Division wholly or partly in cash and in claims payable under Article 3 of said amended decree, or in receiver's certificates payable under Article 3 of said amended decree, to the extent and proportion that such claims and

# Receiverships and Foreclosure Sales During 1919

## One Important Reorganization Under Government Auspices Without Foreclosure Sale

THE LAW under which the President took over the operation of the railroads provided that no judgment could be made against the property of railroads which the President took if this property was used in operation. The owning corporations are receiving rental for the use of their railroad property on a basis entirely independent of their present earnings and expenses, and receiverships, therefore,

ships established in 1919 were none of them government operated roads, nor is there any particular significance to be attached to their bankruptcy.

A foreclosure sale of a large road usually marks the re-

### SUMMARY OF RECEIVERSHIPS FOR 44 YEARS

Year	No. of roads	Miles	Bonds and stocks
1876	42	6,662	\$467,000,000
1877	38	3,637	220,294,000
1878	27	2,320	92,385,000
1879	12	1,102	39,367,000
1880	13	885	140,265,000
1881	5	110	3,742,000
1882	12	912	39,074,000
1883	11	1,990	108,470,000
1884	37	11,038	714,755,000
1885	44	8,836	385,460,000
1886	13	1,799	70,346,000
1887	9	1,046	90,318,000
1888	22	3,270	186,814,000
1889	22	3,803	99,664,000
1890	26	2,963	105,007,000
1891	26	2,159	84,479,000
1892	36	10,508	357,692,000
1893	74	29,340	1,781,046,000
1894	38	7,025	395,791,000
1895	31	4,089	369,075,000
1896	34	5,441	275,597,000
1897	18	1,537	92,909,000
1898	18	2,069	138,701,000
1899	10	1,019	52,285,000
1900	16	1,165	78,234,000
1901	4	73	1,627,000
1902	5	278	5,835,000
1903	9	229	18,823,000
1904	8	744	36,069,000
1905	10	3,593	176,321,000
1906	6	204	55,042,000
1907	7	317	13,585,000
1908	24	8,009	596,359,000
1909	5	859	78,095,000
1910	7	735	51,427,500
1911	5	2,606	210,606,882
1912	13	3,784	182,112,497
1913	17	9,020	477,780,820
1914	22	4,222	199,571,446
1915	12	20,143	1,070,808,628
1916	9	4,439	208,159,689
1917	19	2,486	61,169,962
1918	8	3,519	242,090,800
1919	7	244	11,886,779

### SUMMARY OF FORECLOSURE SALES IN 44 YEARS

Year	No. of roads	Miles	Bonds and stocks
1876	30	3,840	\$217,848,000
1877	54	3,875	198,984,000
1878	48	3,906	311,631,000
1879	65	4,909	243,288,000
1880	31	3,775	263,882,000
1881	29	2,617	137,923,000
1882	16	867	65,426,000
1883	18	1,354	47,100,000
1884	15	710	23,504,000
1885	22	3,156	278,394,000
1886	45	7,687	374,109,000
1887	31	5,478	328,181,000
1888	19	1,596	64,555,000
1889	25	2,930	137,815,000
1890	29	3,825	182,495,000
1891	21	3,223	169,069,000
1892	28	1,922	95,898,000
1893	25	1,613	79,924,000
1894	42	5,643	318,999,000
1895	52	12,831	761,791,000
1896	58	13,730	1,150,377,000
1897	42	6,675	517,680,000
1898	47	6,054	252,910,000
1899	32	4,294	267,534,000
1900	24	3,477	190,374,000
1901	17	1,139	85,808,000
1902	20	693	39,788,000
1903	13	555	15,885,000
1904	13	524	28,266,000
1905	6	679	20,307,000
1906	8	262	10,400,000
1907	6	114	13,777,000
1908	3	138	2,547,000
1909	12	2,629	250,033,000
1910	17	1,100	93,660,109
1911	13	1,386	40,741,543
1912	12	661	25,910,990
1913	6	1,159	86,163,850
1914	9	1,470	83,189,500
1915	11	3,914	285,258,782
1916	26	8,355	703,444,855
1917	20	10,963	557,846,348
1918	11	763	24,735,187
1919	8	459	15,479,587

\*Operation suspended.

†Road abandoned.

of roads being operated by the government were nil. The seven small roads which are shown in the table of receiver-

organization of the company's financial affairs on a basis which it is hoped will prove a favorable one for the operation of the road and the re-establishment of the company's

credit. With the sale, however, of a small road this is not always the case. The foreclosure sale may simply mark a step in the downward progress by which one set of creditors gets out of the affair with what it can, but without the new owners of the property having any well-backed financial plan for the rehabilitation of the credit of the property and for its solvent operation. All of the roads shown in the table

RECEIVERSHIPS ESTABLISHED IN 1919			
Name of company	Mileage	Funded debt outstanding	Stock outstanding
Altoona Northern	16		\$675,000
Colorado Springs & Cripple Creek District Railway	74	2,680,879	2,000,000
Eastern Kentucky	36		3,455,900
Pacific & Eastern	33	300,000	500,000
Pittsburgh & Susquehanna	23	400,000	500,000
Timpson & Henderson	35		250,000
Twin Mountain & Potomac	27	500,000	500,000
Totals	244	4,005,879	7,880,900

of foreclosure sales in 1919 are small ones not under government control. The Georgia Coast & Piedmont was sold with the proviso that the road could be junked. The Gulf, Florida & Alabama may be rehabilitated and another attempt made at profitable operation of the property. The others are short, unimportant lines, some of which may be junked.

There was one important road, the Boston & Maine, which was reorganized under the auspices of the United States Railroad Administration and taken out of the hands of receivers on December 31, 1919. It is not, of course, shown

in either table, because there was no foreclosure sale. The Boston & Maine was put into the hands of receivers originally because the rentals of its leased lines, which, of course, were a fixed charge on the earnings of the parent company, were so high as to leave no margin of safety in periods of depression or abnormally high operating expenses. Under the reorganization holders of stock of the leased lines exchanged their holdings for stock of the Boston & Maine, bearing the same rate of interest which they had received as rental, but temporarily scaled down 20 per cent and made

FORECLOSURE SALES IN 1919			
Name of company	Mileage	Funded debt outstanding	Stock outstanding
Artesian Belt	46		\$70,000
Elkin & Allegheny	15	480,000	476,300
Florida, Alabama & Gulf	26	500,000	150,000
Ft. Smith, Subiaco & Eastern	14	400,000	150,000
Georgia Coast & Piedmont	100	1,807,287	1,572,000
Gulf, Florida & Alabama	157	4,410,000	4,410,000
Ocklawaha Valley	46		250,000
Waycross & Western	45	384,000	420,000
Totals	459	7,981,287	7,498,300

contingent upon earnings. This exchange of a fixed charge for a charge contingent on earnings puts the Boston & Maine in a much sounder financial position, and the credit for bringing the change about is due in part to the United States Railroad Administration and in part to the receiver and of certain members of the reorganization committee.

## RAILROADS IN THE HANDS OF RECEIVERS

Name of road	Mileage	Date of receivership	Bonds of old company	Stock of old company	Total old company securities
Altoona Northern	16	Aug. 8, 1919	\$ 125,000	\$ 675,000	\$ 800,000
Boyer City, Gaylord & Alpena	94	Nov. 19, 1913	800,000	669,300	1,469,300
Cape Girardeau Northern	104	April 14, 1914	1,500,000	110,000	1,610,000
Chicago & Eastern Illinois	1,136	May 27, 1913	59,289,000	18,267,900	77,556,900
Chicago, Peoria & St. Louis	255	July 31, 1914	4,000,000	4,000,000	8,000,000
Colorado Midland	338	July —, 1918	9,532,000	10,000,000	19,532,000
Colorado Springs & Cripple Creek District Railway	74	May 10, 1919	2,680,879	2,000,000	4,680,879
Creston, Winterset & Des Moines	22	June 25, 1914	200,000	98,600	298,600
Danville & Mt. Morris	15	June —, 1894	150,000	50,000	200,000
Denver & Rio Grande	2,610	Jan. 26, 1918	121,802,000	87,779,800	209,581,800
Denver & Salt Lake	255	Aug. 16, 1917	12,514,000	12,182,500	24,696,500
Eastern Kentucky	36	March 31, 1919		3,455,900	3,455,900
Evansville & Indianapolis	146	May 27, 1913	2,500,000	2,000,000	4,500,000
Fellsmere Railroad	16	Jan. 5, 1917			
Ft. Smith & Western	254	Oct. 9, 1915	6,240,000	5,000,000	11,240,000
Georgia & Florida	348	March 27, 1915	7,820,000	8,750,000	16,570,000
Gould Southwestern	18	April 14, 1914	8,929	51,000	59,929
Greenville & Western	23	Aug. 29, 1917	460,000	50,000	510,000
Haynesville & Montgomery	9	March 1, 1917	41,000	50,000	91,000
Houston & Brazos Valley	29	Nov. 27, 1915	420,000	24,000	444,000
Illinois Southern	140	Sept. 18, 1918	3,398,000	5,000,000	8,398,000
International & Great Northern	1,160	Aug. 11, 1914	26,347,000	4,822,000	31,169,000
Kansas City, Mexico & Orient	964	April 17, 1917	31,000,000	20,000,000	51,000,000
Kansas City Northwestern	200	Feb. —, 1917			
Liberty-White	50	Nov. 12, 1914	4,050	300,000	304,050
Louisiana & North West	121	Aug. 23, 1913	2,250,000	2,300,000	4,550,000
Macon & Birmingham	97	Feb. 1, 1908	500,000	500,000	1,000,000
Manistee & North Eastern	190	Dec. —, 1918	1,172,000	1,172,000	2,344,000
Marshall & East Texas	72	Jan. 25, 1917	1,180,000	200,000	1,380,000
Missouri & North Arkansas	365	April 1, 1912	8,353,295	8,340,000	16,693,295
Missouri, Kansas & Texas	1,744	Sept. 27, 1915	101,728,750	76,283,257	178,012,007
Missouri, Kansas & Texas of Texas	1,792	Sept. 27, 1915	35,638,054	10,152,500	45,790,554
Nevada Short Line	12	Jan. —, 1916			
New Berlin & Winfield		Jan. 15, 1919	23,800	30,000	53,800
Ocala Southern	110	July 12, 1918	416,000	265,000	681,000
Orangeburg Railway	17	June 17, 1916		100,000	100,000
Pacific & Eastern	33		300,000	500,000	800,000
Palatine, Lake Zurich & Wauconda	15	Oct. 19, 1914		230,000	230,000
Pine Bluff & Northern	10	Feb. 9, 1916	43,000	160,000	203,000
Pittsburgh & Susquehanna	23	Jan. 15, 1919	300,000	500,000	800,000
Pittsburgh, Shawmut & Northern	205	Aug. 1, 1905	14,655,000	15,000,000	29,655,000
Rome & Northern	28	Feb. 28, 1911		1,000,000	1,000,000
St. Louis & Missouri Southern	8	April 13, 1915			
St. Louis, El Reno & Western	42	Oct. 9, 1915	817,000	970,800	1,787,800
Salina Northern	81	July 27, 1917	1,500,000	1,162,300	2,662,300
San Antonio, Uvalde & Gulf	317	Aug. —, 1914	4,413,000	280,000	4,693,000
Sharpville	18	Jan. 27, 1897	68,779	350,000	418,779
Southwestern Railway	30	Nov. 11, 1917	354,000	35,000	389,000
Tennessee & North Carolina	37	Sept. 13, 1916	454,000	306,100	760,100
Tennessee Central	295	Dec. 31, 1912	12,232,900	7,941,500	20,174,350
Texas & Pacific	1,947	Oct. 27, 1916	54,621,000	38,763,810	93,384,810
Tidewater & Western	93	May 14, 1917	300,000	300,000	600,000
Timpson & Henderson	35	Oct. —, 1919		250,000	250,000
Toledo, Peoria & Western	248	July 2, 1917	4,895,000	4,076,900	8,971,900
Toledo, St. Louis & Western	454	Oct. 22, 1914	27,602,000	19,947,600	47,549,600
Trinity & Brazos Valley	360	June 16, 1914	8,760,000	304,000	9,064,000
Twin Mountain & Potomac	27	—, 1919	500,000	500,000	1,000,000
Wabash, Chester & Western	65	July 15, 1914	690,000	1,250,000	1,940,000
Waupaca Green Bay	3	Aug. —, 1917	75,000	1,400	76,400
Wichita Falls & Northwestern	329	June —, 1917		2,000,000	2,000,000
Williamsport & North Branch	56	Jan. 8, 1917	545,000	1,324,662	1,869,662
	17,608		575,319,436	381,832,829	957,152,265

\*Discontinued operation.



# AGREEMENT BETWEEN THE DIRECTOR GENERAL OF RAILROADS

AND THE

COMPANY

## PREAMBLE AND RECITALS.

This Agreement, made this ..... day of ....., 1918,  
between William G. McAdoo, Director General of Railroads, hereinafter called the Director  
General, acting on behalf of the United States and the President, under the powers conferred

## Status of the Railroad Contract Negotiations

### 129 Companies Have Agreed with the Government on Com- pensation for Use of Their Property

A TOTAL OF 128 CONTRACTS between railroad companies and the Railroad Administration covering the compensation to be paid by the government for the use of their property during the period of federal control have been executed. These include 96 Class I roads; 127 contracts provide for an annual compensation of \$716,435,061, while 2 additional contracts provide for lump sum payments, amounting to \$129,734.80. The total provided for in the contracts executed covers, therefore, about three-fourths of the estimated total of the standard return guaranteed under the federal control act, which is about \$940,000,000. The roads that have not yet signed up include mainly those that have claims for special compensation greater than that proposed to be allowed by the Railroad Administration.

The list of standard contracts between the director general of railroads and carriers under federal control is as follows. (Where dates appear after the name of the road it indicates that the contracts became effective at some other time than January 1, 1918):

	Compensation
Abilene & Southern Railway Company (July 1, 1918).....	\$78,375.18
*Alabama & Vicksburg Railroad.....	322,854.47
*Atchison, Topeka & Santa Fe.....	42,810,310.80
Grand Canyon Railroad.	
Kansas & Southwestern Railroad.	
Rio Grande, El Paso & Santa Fe.	
*Gulf, Colorado & Santa Fe.	
*Panhandle & Santa Fe.	
*Atlanta, Birmingham & Atlantic Ry. Co.....	480,000.00
Atlantic & Western Railroad (August 1, 1918).....	12,660.72
*Atlantic Coast Line Railroad.....	10,185,942.34
Washington & Vandemere.	
Tampa Southern.	
Augusta Southern Railway (November 1, 1918).....	28,000.00
*Baltimore, Chesapeake & Atlantic Railroad Co.....	86,647.38
*Baltimore & Ohio.....	30,031,009.14
*Staten Island Rapid Transit Company.	
Sandy Valley & Elkhorn.	
B. & O. Chicago Terminal.	
*Coal & Coke.	
Long Fork Railway.	
*Bangor & Aroostook Railroad.....	1,575,171.64
Van Buren Bridge Co.	
Bennettsville & Cheraw (July 1, 1918).....	29,077.92
Birmingham & Northwestern Railway (May 1, 1918).....	34,522.86
*Boston & Maine.....	9,832,490.52
Vermont Valley Railway Company.	
Montpelier & Wells River.	
Barre & Chelsea Railroad Company.	
Sullivan County Railroad Company.	

Indentations indicate subsidiary parties to the one contract.  
\*Indicates Class 1 roads.

Brooklyn Eastern District Terminal.....	\$306,259.63
*Buffalo & Susquehanna Railroad Corporation.....	591,612.97
Buffalo Creek Railroad.....	409,397.76
*Buffalo, Rochester & Pittsburgh Railway.....	3,276,410.42
*Central New England.....	1,468,123.63
*Central of Georgia Railroad.....	3,402,064.26
Wadley Southern.	
Sylvania Central.	
*Central Vermont Railway.....	835,402.22
Central Vermont Trans. Company.	
*Central Railroad Company of New Jersey.....	9,352,301.13
*Charleston & Western Carolina Railway.....	466,921.15
Chesapeake Steamship Company.....	102,048.99
*Chicago & Northwestern Railway Company.....	23,364,028.55
Missouri Valley & Blair Ry. & Bridge Company.	
Pierre & Ft. Pierre Bridge & Ry. Company.	
Pierre Rapid City & Northwestern.	
Wolf River Valley.	
Wyoming & Northwestern.	
*Chicago & Western Indiana Railroad Company.....	1,509,530.15
*Chicago, Burlington & Quincy Railroad Company.....	33,390,079.61
Black Hill & Fort Pierre.	
Deadwood Central.	
Quincy, Omaha & Kansas City.	
*Chicago Great Western Railroad Company.....	2,953,449.94
*Chicago, Indianapolis & Louisville Ry. Company.....	1,620,258.75
Chicago Heights Terminal Transfer Railroad Company.....	67,131.89
*Chicago, Milwaukee & St. Paul Ry. Company.....	27,946,771.45
Tacoma Eastern Railroad Company.	
Bellingham & Northern Ry. Company.	
Seattle, Port Angeles & Western Ry. Company.	
Milwaukee Terminal Ry. Company.	
*Puget Sound & Willapa Harbor Ry. Company.	
Gallatin Valley Railway Company.	
Chicago Junction Railway.....	916,804.03
Chicago River & Indiana Railroad Company.....	108,525.82
*Chicago, St. Paul, Minneapolis & Omaha Ry.....	4,934,789.51
*Chicago, Terre Haute & Southeastern Ry.....	922,784.87
*Cincinnati Northern Railroad.....	317,628.01
*Cleveland, Cincinnati, Chicago & St. Louis.....	9,945,738.41
Muncie Belt Railway.	
*Colorado & Southern.....	2,833,578.93
*Wichita Valley.	
Cumberland & Pennsylvania Railroad.....	255,692.10
*Delaware, Lackawanna & Western.....	15,749,476.74
Denison & Pacific Suburban Ry. Company.....	4,702.45
*Denver & Rio Grande.....	8,319,376.67
*Detroit & Mackinac Railway Company.....	310,664.04
Detroit, Bay City & Western.....	85,967.31
Detroit Terminal Railroad.....	186,460.40
Durham & Southern Ry. Company (July 1, 1918).....	133,410.22
*El Paso & Southwestern.....	4,145,102.30
*Erie Railroad.....	15,729,068.09
*Chicago & Erie.	
Escanaba & Lake Superior.....	58,688.01
*Fort Worth & Denver City Ry. Company.....	1,891,386.40
Gainesville Midland.....	22,731.58
Galveston Wharf Company (August 1, 1918).....	526,069.92
Georgia & Florida Railway (November 1, 1918).....	88,000.00
Georgia, Florida & Alabama Ry. (September 1, 1918).....	57,637.73
*Georgia Railroad.....	858,662.42
*Grand Rapids & Indiana.....	929,385.42
Green Bay & Western Railroad.....	331,954.91
Ahnapee & Western Ry. Company.	
Kewaunee, Green Bay & Western Railroad Company.	

*Great Northern Railway.....	\$28,771,360.78	*Union Pacific Railroad.....	\$38,416,110.79
Duluth & Superior Bridge.		*Oregon Short Line.....	
Duluth Terminal.....		*Oregon & Washington Ry. & Nav. Co.	
Great Falls & Teton County.		Des Chutes Railway.....	
Great Northern Equipment Company.		Green River Water Company.	
Great Northern Terminal.		Rattlesnake Water Company.	
Minneapolis Western.		Union Pacific Water Company.	
Minneapolis Belt.		*Vicksburg, Shreveport & Pacific Ry. Company.....	337,947.96
Montana Eastern.		*Washington Southern.....	467,230.04
Watertown & Sioux Falls.		Waterloo, Cedar Falls & Northern Railroad Company.....	374,373.41
Gulf, Texas & Western Railway (August 1, 1918), lump sum	29,734.80	Weatherford, Mineral Wells & Northwestern.....	31,148.57
*Hocking Valley Railway Company.....	2,637,167.48	*Western Railway of Alabama.....	288,237.53
*Hudson & Manhattan.....	3,003,362.77	Wrightsville & Tennille Railroad.....	41,027.82
*Illinois Central.....	16,540,717.32	Winston-Salem Southbound Railway.....	260,251.62
Chicago, Memphis & Gulf.		Wiggins Ferry Company.....	416,675.60
Dunleith & Dubuque Bridge.		East St. Louis Connecting.	
Central Elevator & Warehouse Company.		St. Louis Transfer.	
Mississippi Valley Corporation.		*Yazoo & Mississippi Valley.....	3,862,317.83
Indiana Harbor Belt.....	296,053.57	96 Class 1 roads.	
*Kansas City, Mexico & Orient Railroad.....	150,000.00	127 Contracts with annual compensation.....	\$716,435.061
*The Kansas City, Mexico & Orient Ry. of Texas.		2 Contracts with lump sum of.....	129,734.80
Lake Erie & Eastern.....	127,081.06	WAIVER OF CLAIMS EXECUTED	
*Lake Erie & Western.....	1,548,541.69	Alcolu Railroad.	Raritan River Railroad.
Leavenworth Terminal Ry. & Bridge Company.....	43,583.48	Asherton & Gulf Railway.	Red River & Gulf.
*Lehigh & New England Railroad Company.....	1,135,760.91	Blytheville, Burdette & Mississippi	Roby & Northern.
*Lehigh & Hudson River Railway.....	519,371.13	River.	Salem, Winona & Southern Rail-
*Lehigh Valley Railroad.....	11,318,714.48	Butte, Anaconda & Pacific.	road Company.
*Los Angeles & Salt Lake Railroad.....	3,414,751.10	Cairo, Truman & Southern.	San Luis Southern Railway Co.
*Louisville & Nashville Railroad.....	17,310,494.67	Campbell's Creek Railroad.	Santa Maria Valley.
*Louisville, Henderson & St. Louis Ry.....	343,915.53	Duluth & Northeastern.	Savannah & Southern Railway.
Louisiana & Mississippi Railroad & Transfer Company.....	41,689.33	Franklin & Abbeville.	Sierra Railway of California.
Louisville & Wadley Railroad Company.....	5,367.23	Georgia Coast & Piedmont.	Skaneateles Railroad.
*Maryland, Delaware & Virginia Ry. Company.....	49,543.23	Grafton & Upton.	Tionesta Valley.
*Maine Central Railroad Company.....	2,955,696.88	Hartford & Eastern.	Tuckerton Railroad.
Memphis, Dallas & Gulf Railroad (July 1, 1918).....	28,295.70	Holton Inter-Urban Railway.	Virginia & Carolina Southern Rail-
*Michigan Central Railroad.....	8,105,727.04	Kaydeross Railroad Corporation.	road.
Chicago, Kalamazoo & Saginaw.		Lake Erie, Franklin & Clarion.	West Virginia Northern.
Minneapolis Eastern Ry. Company.....	30,332.61	Laurensburg & Southern.	Woodward & Louisiana Central.
*Minneapolis, St. Paul & Sault Ste. Marie.....	10,578,977.09	Lewiston, Nez Perce & Eastern.	Winfield Railroad.
*Minnesota & International Railway Company.....	202,455.24	McCloud River.	Woodstock Railway.
*Missouri & North Arkansas (September 24, 1918).....	175,000.00	Moshassuck Valley.	Wyoming & Missouri River.
Missouri & Illinois Bridge & Belt Railroad Company.....	102,518.06	Norton & Northern.	Yosemite Valley.
Morgantown & Kingwood Railroad Company (March 21, 1918).....	51,362.93	Ohio & Kentucky.	Yreka Railroad.
*Nashville, Chattanooga & St. Louis Railroad.....	3,182,089.03	Potato Creek.	
New England Steamship Company.....	1,050,753.33		
The Hartford and New York Trans. Company.			
New Bedford, Martha's Vineyard & Nantucket Steam-			
boat Company.			
*New Orleans Great Northern Railroad Company.....	519,904.35		
*New York Central Railroad.....	58,122,084.92		
Kanawha & West Virginia.			
Zanesville & Western.			
*Kanawha & Michigan.			
*Toledo & Ohio Central.			
*New York, New Haven & Hartford Railroad Company....	17,173,366.56		
*New York, Ontario & Western.....	2,103,589.41		
*New York, Susquehanna & Western.....	999,941.74		
Wilkes Barre & Eastern.			
*Norfolk & Western Railway.....	20,640,899.98		
New River, Holston & Western.			
Tug River & Kentucky.			
Virginia-Carolina Railway.			
Williamson & Pond Creek.			
Norfolk Southern.....	1,280,000		
*Northern Pacific Railway.....	30,130,068.81		
Big Fork & International Falls.			
Gilmore & Pittsburgh.			
Ocean Steamship Company of Savannah.....	1,048,782.69		
Pacific Fruit Express Company.....	1,218,324.68		
*Pennsylvania Lines (West)....	15,154,719.81		
Wheeling Terminal Railway.			
Cincinnati, Lebanon & Northern.			
Ohio River & Western.			
Manufacturers Railway.			
*Pennsylvania Railroad.....	53,603,427.58		
Baltimore & Sparrows Point Railroad.			
*Cumberland Valley Railroad.			
*New York, Philadelphia & Norfolk.			
Union Railroad Company of Baltimore.			
Barneget Railroad.			
Philadelphia & Beach Haven.			
Roslyn Connecting Railroad.			
Philadelphia & Camden Ferry.....	401,556.86		
Pittsburgh, Chartiers & Youghiogheny Ry.....	180,614.38		
*Pittsburgh & Lake Erie Railroad.....	8,980,219.40		
Port Huron Southern Railroad.....	11,025.78		
Pullman Company.....	11,750,000.00		
*Richmond, Fredericksburg & Potomac.....	1,136,973.75		
*Rutland Railroad.....	1,023,883.21		
Salina Northern Railroad (September 1, 1918).....	15,000.00		
St. Louis Merchants Bridge Terminal Ry.....	412,427.56		
*St. Joseph & Grand Island Ry.....	373,811.11		
St. Paul Bridge & Terminal Railway Company.....	67,509.40		
Sioux City Terminal Railway Company.....	17,352.93		
*Southern Pacific.....	47,959,898.08		
*Arizona Eastern.			
*Houston & Texas Central			
*Galveston, Harrisburg & San Antonio.			
*Texas & New Orleans.			
Houston & Shreveport.			
*Houston East & West Texas.			
*Morgan's Louisiana & Texas Railroad & S. S. Company.			
*Louisiana Western.			
Lake Charles & Northern.			
Iberia & Vermilion.			
Sunset Railway Company.....	64,562.79		
Susquehanna & New York Railroad Co. (September 1, 1918)	56,884.89		
*Toledo, Peoria & Western Ry. Company.....	159,739.77		
Terminal Railway Ass'n of St. Louis.....	2,574,510.88		
*Texas & Pacific Railway Company.....	4,107,432.49		
*Trinity & Brazos Valley (August 1, 1918), lump sum....	100,000.00		
Trans-Mississippi Terminal Railroad Company.....	665,391.57		
Union Freight Railroad Company.....	32,009.69		

The federal control act provides that where no contract has been made the President may, nevertheless, pay to any carrier while under federal control an amount, payable in reasonable installments, not exceeding 90 per cent of the estimated just compensation, remitting to such carriers its legal rights for any balance claimed, and under this provision sums have been doled out as needed to many of the companies that have not executed contracts.

The standard return for the companies that have not yet made contracts is shown in the following table giving the certifications of the average annual railway operating income for the test period as thus far made to the President by the Interstate Commerce Commission. (The list includes many roads that were relinquished by the Railroad Administration. Deficits are in italics:

Name of carrier	Income
Akron Union Passenger Depot Company.....	\$8,289.92
Akron & Barberton Belt Railroad Company.....	30,103.76
Alabama Great Southern Railroad Company.....	1,703,179.65
Albany Passenger Terminal Company.....	5,648.49
Alton & Southern Railroad.....	23,121.87
American Refrigerator Transit Company <sup>1</sup> .....	546,707.97
Ann Arbor Railroad Company.....	526,882.96
Anthony & Northern Ry. Company.....	9,512.52
Arizona & New Mexico Ry. Company.....	300,965.13
Arkansas Central Railroad Company.....	6,838.58
Arkansas Western Ry. Company.....	d 6,575.51
Arkansas & Louisiana Midland Ry. Company.....	31,994.06
Arkansas & Memphis Railroad Bridge & Terminal Company.	296,113.18
Asheville & Craggy Mountain Ry. Company.....	d 3,017.13
Ashland Coal & Iron Ry. Company.....	73,569.57
Atlanta Terminal Company.....	68,935.62
Atlanta & West Point Railroad Company.....	252,995.16
Atlantic City Railroad Company.....	222,066.04
Atlantic & St. Lawrence Railroad Company.....	d 4,271.12
Atlantic & Yadkin Ry. Company.....	d 57,470.72
Augusta Union Station Company.....	12,978.60
Augusta & Summerville Railroad Company.....	d 286.90
Baltimore Steam Packet Company <sup>2</sup> .....	100,793.08
Bath & Hammondsport Railroad Company.....	7,221.43
Beaumont, Sour Lake & Western Ry. Company.....	d 34,546.12
Beaumont Wharf & Terminal Company.....	4,191.72
Pellineham & Northern Ry. Company.....	40,305.24
Belt Ry. Company of Chicago.....	869,442.49
Bessemer & Lake Erie Railroad Company.....	4,674,714.44
Big Fork & International Falls Ry. Company.....	31,931.82
Bingham & Garfield Ry. Company.....	1,234,492.96
Birmingham Terminal Company.....	77,456.16
Black Mountain Ry. Company.....	34,285.23
Blue Ridge Ry. Company.....	37,887.22
Bridgton & Saco River Railroad Company.....	16,136.37

<sup>1</sup> No operating returns made to the commission. Operating income ascertained and certified at the request of the director general.

<sup>2</sup> Boat lines.

<sup>3</sup> Operated by electricity.

d—Deficit.



Name of carrier	Income	Name of carrier	Income
Brimstone Railroad & Canal Company.....	\$42,113.26	Kansas Southwestern Railway Company.....	d \$43,852.04
Brownwood North & South Ry. Company.....	d 8,522.07	Keokuk Union Depot Company.....	d 4,451.37
Bullfrog Goldfield Railroad Company.....	19,338.90	Keokuk & Hamilton Bridge Company.....	28,828.19
Calumet, Hammond & Southeastern Railroad Company.....	d 10,619.94	Kinston-Carolina Railroad Company.....	9,708.39
Calumet Western Ry. Company.....	d 3,216.89	Lackawanna & Montrose Railroad Company.....	d 9,232.08
Canadian Pacific Ry. Company lines in Maine.....	251,555.44	Lake Erie & Pittsburg Ry. Company.....	400,674.72
Canadian Pacific Ry. Company's Pacific Coast steamers in United States.....	152,311.01	Lake Erie Steamboat Company.....	28,608.72
Carolina, Clinchfield & Ohio Ry.....	1,581,950.33	Lake Superior Terminal & Transfer Ry. Company of Wis.....	d 93.05
Carolina, Clinchfield & Ohio Ry. of S. C.....	46,013.14	Lake Superior & Ishpeming Ry. Company.....	134,584.95
Carolina Railroad Company.....	3,420.64	Lawrenceville Branch Railroad Company.....	d 501.01
Carolina & Northwestern Ry. Company.....	64,599.62	Leavenworth Depot & Railroad Company.....	14,933.32
Carolina & Tennessee Southern Ry. Company.....	d 2,092.94	Lewiston & Auburn Railroad Company.....	d 22,251.78
Catasauqua & Fogelsville Railroad Company.....	141,512.32	Lexington Union Station Company.....	15,435.26
Central New York Southern Railroad Corp.....	16,502.19	Lime Rock Railroad Company.....	22,349.89
Central Indiana Ry. Company.....	d 61,743.10	Litchfield & Madison Ry. Company.....	116,597.96
Central Transfer Ry. & Storage Company.....	2,986.33	Little Kanawha Railroad Company.....	d 11,339.35
Central Union Depot & Ry. Company of Cincinnati.....	114,842.27	Long Island Railroad Company.....	3,221,948.91
Champlain Transportation Co.....	d 2,864.54	Lorain, Ashland & Southern Railroad Company.....	d 108,877.98
Charleston Terminal Company.....	24,986.24	Lorain & West Virginia Ry. Company.....	137,277.98
Charleston Union Station Company.....	12,368.57	Louisiana & Arkansas Ry. Company.....	407,987.27
Charlotte, Monroe & Columbia Railroad.....	d 344.43	Louisiana Ry. & Nav. Company.....	357,353.37
Chattahoochee Valley Ry. Company.....	42,341.29	Louisiana Southern Ry. Company.....	25,463.28
Chattanooga Station Company.....	43,604.48	Louisville and Jeffersonville Bridge and Railroad Company.....	169,701.70
Cherry Tree & Dixonville Railroad Company.....	67,926.10	Macon, Dublin & Savannah Railroad Company.....	90,575.92
Chesapeake & Ohio Ry. Company.....	13,226,983.23	Macon Terminal Company.....	79,741.69
Chester & Delaware River Railroad Company.....	161,332.28	Mackinac Transportation Company.....	d 74,387.38
Chesterfield & Lancaster Railroad Company.....	1,267.43	Manistiquette & Lake Superior Ry. Company.....	21,453.73
Cheswick & Harmar Railroad Company.....	d 770.90	Manitowish & Pikes Peak Ry. Company.....	29,922.68
Chicago, Detroit & Canada Grand Trunk Junction R. R. Co.....	195,202.69	Manufacturers' Junction Ry. Company.....	19,042.83
Chicago, Milwaukee & Gary Company.....	d 37,514.03	Manufacturers' Ry. Company (St. Louis, Mo.).....	d 10,183.52
Chicago, Peoria & St. Louis Railroad Company, Bluford Wilson and William Cotter, receivers.....	127,540.49	Marion & Southern Railroad Company.....	4,208.88
Chicago, Rock Island & Gulf Ry. Company.....	968,302.31	Marquette & Bessemer Dock & Nav. Company.....	19,407.63
Chicago, Rock Island & Pacific Ry. Company.....	14,912,378.91	Memphis Union Station Company.....	121,353.84
Chicago & Alton Railroad Company.....	3,178,314.92	Meridian & Memphis Ry. Company.....	29,215.74
Chicago & Eastern Illinois Railroad Company.....	2,946,000.88	Meridian Terminal Company.....	13,987.64
Cincinnati, Burnside & Cumberland River Ry. Company.....	4,239.02	Michigan Air Line Ry.....	d 83,482.25
Cincinnati, Findlay & Fort Wayne Ry. Company.....	d 51,802.01	Middletown & Hummelstown Railroad Company.....	d 4,112.91
Cincinnati, Indianapolis & Western Railroad Company.....	422,212.83	Middletown & Unionville Railroad Company.....	24,835.44
Cincinnati, New Orleans & Texas Pacific Ry. Company.....	3,541,039.53	Midland Valley Railroad Company.....	444,345.95
Cincinnati, Saginaw & Mackinaw Railroad Company.....	d 97,602.92	Millers Creek Railroad Company.....	4,006.62
Clinton & Oklahoma Western Ry. Company.....	45,241.33	Mineral Range Railroad Company.....	147,432.29
Coal Belt Electric Ry. Company.....	12,689.11	Minneapolis & Rainy River Ry. Company.....	d 9,033.98
Colorado & South-Eastern Railroad Company.....	34,982.75	Minneapolis & St. Louis Railroad Company.....	2,639,857.25
Columbia Union Station Co.....	4,569.48	Minnesota Transfer Ry. Company.....	96,250.07
Connecting Terminal Railroad Company.....	61,243.93	Mississippi Central Railroad Company.....	309,216.35
Cooperstown & Charlotte Valley Railroad Company.....	d 15,381.59	Missouri, Kansas & Texas Ry. Company.....	5,853,831.21
Copper Range Railroad Company.....	222,781.19	Missouri, Kansas & Texas Ry. Company of Texas.....	621,773.00
Cumberland Railroad Company.....	d 412.32	Missouri, Oklahoma & Gulf Ry. Company.....	d 83,603.08
Cuyahoga Valley Ry. Company.....	d 413.73	Missouri, Oklahoma & Gulf Ry. Company of Texas.....	d 44,358.33
Dallas Terminal Ry. & Union Depot Co.....	40,820.22	Missouri Pacific Railroad Company.....	14,206,814.41
Danville & Western Ry. Company.....	135,308.08	Mobile & Ohio Railroad Company.....	2,597,478.39
Dayton Union Ry. Company.....	48,912.05	Monongahela Ry. Company.....	583,086.47
Dayton & Union Railroad Company.....	d 8,241.06	Montauk Steamboat Company, Ltd.....	25,975.39
Death Valley Railroad Company.....	74,299.62	Mount Hope Mineral Railroad Company.....	19,171.43
Delaware & Hudson Company.....	7,409,600.12	Munising, Marquette & Southeastern Ry. Company.....	93,281.70
Delta Southern Ry.....	d 48,136.23	Natchez & Louisiana Ry. Transfer Company.....	432.01
Dents Run Railroad Company.....	d 7,480.34	Natchez & Southern Ry. Company.....	879.56
Denver & Salt Lake Railroad Company.....	353,289.67	Nevada Northern Ry. Company.....	882,336.01
Des Moines Union Ry. Company.....	148,666.76	New Jersey & New York Railroad Company.....	d 8,710.35
Detroit, Grand Haven & Milwaukee Ry. Company.....	146,643.56	New Orleans Terminal Company.....	565,034.70
Detroit & Huron Ry. Company.....	d 21,157.26	New Orleans, Texas & Mexico Ry. Company.....	218,773.01
Detroit, Toledo & Ironton Railroad Company.....	225,895.02	New Orleans & Northeastern Railroad Company.....	1,204,992.06
Detroit & Toledo Shore Line Railroad Company.....	456,512.17	Newport & Richford Railroad Company.....	d 29,479.08
Direct Navigation Company.....	d 11,857.50	New York Bay Railroad Company.....	274,050.44
Duluth, Missabe & Northern Ry. Company.....	5,122,051.04	New York, Chicago & St. Louis Railroad Company.....	2,218,856.59
Duluth, South Shore & Atlantic Ry. Company.....	594,637.41	Norfolk Southern Railroad Company.....	1,166,990.77
Duluth Union Depot & Transfer Company.....	32,175.84	Norfolk Terminal Ry. Company.....	44,336.94
Duluth & Iron Range Railroad Company.....	2,355,241.74	Norfolk & Portsmouth Belt Line Railroad Company.....	d 48,667.65
Durham Union Station Company.....	6,953.60	Northeast Pennsylvania Railroad Company.....	d 23,793.83
Eastern Texas Railroad Company.....	3,852.23	Northampton & Bath Railroad Company.....	d 2,585.22
Eddystone & Delaware River Railroad Company.....	2,733.50	Northern Alabama Ry. Company.....	150,582.97
Elgin, Joliet & Eastern Ry. Company.....	2,862,177.21	Northern Pacific Ry. Company.....	30,057,760.06
El Paso Union Passenger Depot Company.....	20,050.45	Northern Pacific Terminal Company of Oregon.....	99,709.18
Evansville & Indianapolis Railroad Company.....	d 112,280.21	Northwestern Coal Ry. Company.....	d 3,242.17
Fairchild & North-Eastern Ry. Company.....	d 19,469.43	Northwestern Pacific Railroad Company.....	1,235,101.00
Farmers' Grain & Shipping Company.....	5,555.30	Northwestern Terminal Ry. Company.....	2,349.04
Florida East Coast Ry. Company.....	2,842,842.20	Ocala Southern Railroad Company.....	d 9,826.26
Fort Dodge, Des Moines & Southern Railroad Company.....	579,071.75	Ogden Union Ry. & Depot Company.....	54,785.99
Fort Smith & Western Railroad Company.....	80,499.46	Old Dominion S. S. Company.....	252,893.61
Fort Worth Belt Ry. Company.....	55,108.96	Ontonagon Railroad Company.....	126.67
Fort Worth & Rio Grande Ry. Company.....	1,300.99	Orange & Northwestern Railroad Company.....	d 27,441.12
Frankfort & Cincinnati Ry. Company.....	8,435.07	Oregon Electric Ry. Company.....	141,146.38
Galveston, Houston & Henderson Railroad Company.....	127,366.25	Oregon Trunk Ry.....	84,722.38
Georgia Southern & Florida Ry. Company.....	511,457.13	Paris & Great Northern Railroad Company.....	d 39,385.14
Georgia Southwestern & Gulf Railroad Company.....	21,957.97	Peoria Ry. Terminal Company.....	38,402.38
Gettysburg & Harrisburg Ry. Company.....	38,955.46	Peoria & Pekin Union Ry. Company.....	306,513.72
Gilmore & Pittsburgh Railroad Company (Ltd.).....	40,376.93	Pennsylvania Terminal Ry. Company.....	175,240.89
Glenn-Pool Tank Line Co.....	11,592.22	Pere Marquette Ry. Company.....	3,748,196.09
Grand Trunk Milwaukee Car Ferry Company.....	53,018.86	Perkiomen Railroad Company.....	339,090.56
Grand Trunk Western Ry. Company.....	1,012,993.62	Philadelphia Belt Line Railroad Company.....	8,525.99
Greenwich & Johnsonville Ry. Company.....	49,534.30	Philadelphia Grain Elevator Company.....	98,749.82
Gulf, Mobile & Northern Railroad Company.....	558,337.86	Philadelphia, Newton & New York Railroad Company.....	2,565.67
Gulf & Ship Island Railroad Company.....	597,455.62	Philadelphia & Chester Valley Railroad Company.....	5,074.21
Gulf Terminal Company.....	25,754.02	Philadelphia & Reading Ry. Company.....	15,868,331.36
Hamilton Belt Ry. Company.....	7,040.29	Philadelphia, Baltimore & Washington Railroad Company.....	3,610,839.54
Hannibal Connecting Railroad Company.....	d 2,565.55	Pickering Valley Railroad Company.....	24,917.31
Harriman & Northeastern Railroad Company.....	51,645.62	Piedmont & Northern Ry. Company.....	435,789.34
Hartwell Ry. Company.....	4,393.75	Pine Bluff Arkansas River Ry.....	d 12,887.78
Hawkinsville & Florida Southern Ry. Company.....	3,333.30	Pittsburgh, Cincinnati, Chicago & St. Louis Railroad Company.....	11,334,093.67
High Point, Randleman, Asheboro & Southern Railroad Co.....	d 28,146.94	Pittsburgh & Shawmut Railroad Company.....	613,261.14
Houston & Brazos Valley Ry. Company.....	31,416.52	Pittsburgh & West Virginia Ry. Company.....	237,009.89
Huntingdon & Broad Top Mountain Railroad & Coal Co.....	201,694.22	Pontiac, Oxford & Northern Railroad Company.....	d 13,861.01
Indianapolis Union Ry. Company.....	226,781.02	Port Arthur Canal & Dock Company.....	d 36,049.44
International & Great Northern Ry. Company.....	1,394,945.98	Portland Terminal Company.....	274,689.90
Intermountain Ry. Company.....	9,204.31	Port Reading Railroad Company.....	235,697.96
Interstate Railroad Company.....	83,786.51	Port Townsend & Puget Sound Ry. Company.....	d 136.94
Iowa Transfer Ry. Company.....	2,414.96	Poteau Valley Railroad Company.....	d 3,232.19
Joliet Union Depot Company.....	22,664.53	Pueblo Valley Depot & Railroad Company.....	32,688.87
Joplin Union Depot Company.....	30,044.58	Quana, Acme & Pacific Ry. Company.....	98,939.02
Kankakee & Seneca Railroad Company.....	d 42,164.52	Raleigh & Charleston Railroad Company.....	17,371.55
Kansas City, Clinton & Springfield Ry. Company.....	7,889.85	Railway Transfer Company of Minneapolis.....	105,014.44
Kansas City, Shreveport & Gulf Terminal Company.....	6,014.66	Rapid City, Black Hills & Western Railroad Company.....	13,003.56
Kansas City Southern Ry. Company.....	3,216,697.65	Reading & Columbia Railroad Company.....	18,230.27
Kansas City Terminal Ry. Company.....	1,999,313.50	Rio Grande Southern Railroad Company.....	144,365.69
		Rock Island Frisco Terminal Ry. Company.....	167,034.76
		Rupert & Bloomsburg Railroad Company.....	6,050.57

Name of carrier	Income	Name of carrier	Income
St. Johnsbury & Lake Champlain Railroad Company.....	d \$23,150.77	Winona Bridge Ry. Company.....	\$38,876.91
St. Joseph Belt Ry. Company.....	44,854.81	Woodstock & Blocton Ry. Company.....	14,918.83
St. Joseph Terminal Railroad Company.....	14,083.73	Yadkin Railroad Company.....	52,950.56
St. Louis, Brownsville & Mexico Ry. Company.....	983,890.01	York Harbor & Beach Railroad Company.....	5,371.74
St. Louis National Stock Yards Co.....	40,474.56		
St. Louis & O'Fallon Ry. Company.....	99,702.27		
St. Louis-San Francisco Ry. Company.....	13,690,212.98		
St. Louis, San Francisco & Texas Ry. Company.....	d 327,035.36		
St. Louis Southwestern Ry. Company.....	3,355,748.99		
St. Louis Southwestern Ry. Company of Texas.....	555,164.52		
St. Louis, Troy & Eastern Railroad Company.....	143,257.24		
St. Paul Union Depot Company.....	86,942.39		
Salt Lake City Union Depot & Railroad Company.....	70,434.88		
San Antonio & Aransas Pass Ry. Company.....	373,051.70		
San Antonio, Uvalde & Gulf Railroad Company.....	55,928.38		
Sandy River & Rangeley Lake Railroad.....	46,666.42		
San Francisco & Portland S. S. Company <sup>2</sup> .....	36,769.13		
Savannah Union Station Company.....	27,429.09		
Schoharie Valley Ry. Company.....	10,707.82		
Seaboard Air Line Ry. Co.....	6,497,024.85		
Sharpsville Railroad Company.....	15,646.14		
Shreveport Bridge & Terminal Company.....	48,229.99		
Sidell & Olney Railroad Company.....	d 49,235.88		
Sioux City Bridge Company.....	81,060.81		
Southern Illinois & Missouri Bridge Company.....	120,011.67		
Southern Pacific Terminal Company.....	207,444.48		
Southern Ry. Company.....	18,653,893.15		
Spokane International Ry. Company.....	6,989.50		
Spokane, Portland & Seattle Ry. Company.....	190,985.85		
Standard & Hernando Railroad Company.....	1,871,083.00		
Stewartstown Railroad Company.....	d 12,773.51		
Stony Creek Railroad Company.....	10,327.44		
Susquehanna, Bloomsburg & Berwick Railroad Company....	17,368.77		
Sussex Railroad Company.....	49,722.26		
Tallulah Falls Ry. Company.....	d 29,937.64		
Tamaqua, Hazleton & Northern Railroad Company.....	5,353.98		
Tampa Northern Railroad Company.....	1,457.50		
Tampa Union Station Company.....	d 22,276.84		
Tampa & Gulf Coast Railroad Company.....	14,660.40		
Tennessee Central Railroad Company.....	2,359.80		
Texas City Terminal Company.....	162,733.55		
Texas City Terminal Company.....	318,729.68		
Texas Midland Railroad.....	37,771.30		
Texas Southeastern Railroad Company.....	59,348.35		
Tidewater Southern Ry. Company.....	23,012.96		
Toledo, Saginaw & Muskegon Ry. Company.....	7,251.27		
Toledo Terminal Railroad Company.....	d 115,737.85		
Toledo, St. Louis & Western Railroad Company.....	252,999.43		
Tonopah & Tidewater Railroad Company.....	994,294.38		
Troy Union Railroad Company.....	182,638.84		
Ulster & Delaware Railroad Company.....	11,852.69		
Union Depot Company (Columbus, Ohio).....	128,009.47		
Union Ry. Company (Memphis, Tenn.).....	58,058.17		
Union Railroad Company (Pa.).....	84,690.41		
Union Stock Yards Company of Omaha (Ltd.).....	1,370,290.23		
Union Terminal Ry. Company.....	149,812.64		
Union Terminal of Dallas.....	29,678.71		
Virginia Navigation Company <sup>2</sup> .....	296,616.04		
Virginian Ry. Company.....	d 2,240.60		
Wabash Ry. Company.....	3,247,603.41		
Ware Shoals Railroad Company.....	5,826,809.91		
Waupaca-Green Bay Ry.....	10,553.30		
Waynesburg & Washington Railroad Company.....	2,780.19		
West Jersey & Seashore Railroad Company.....	12,028.15		
West Side Belt Railroad Company.....	952,681.93		
Western Cable Ry. Company.....	186,330.78		
Western Maryland Ry. Company.....	d 5,442.84		
Western Pacific Railroad Company.....	3,079,593.35		
Wheeling & Lake Erie Ry. Company.....	1,900,349.74		
Wichita Falls & Northwestern Ry. Company.....	1,586,037.32		
Wichita Union Terminal Ry. Company.....	145,245.24		
Wilkes-Barre Connecting Railroad Company.....	103,926.78		
Williams Valley Railroad Company.....	33,230.72		
	2,486.86		

Co-operative short-line contracts have been executed as follows:

Akron, Canton & Youngstown.  
Alabama Central Railroad.  
Alabama Central Railway.  
Alabama, Florida & Gulf.  
Alabama & Mississippi Railroad.  
Alabama & Northwestern.  
Alabama, Tennessee & Northern Railroad.  
Arcade & Attica.  
Atlanta & St. Andrews Bay Ry.  
Atlantic Northern.  
Augusta Northern.  
Augusta Railroad.  
Bartlett Western.  
Batesville Southwestern.  
Beaver, Meade & Englewood R. R.  
Birmingham & Southeastern.  
Bowdon Railroad.  
Boyne City, Gaylord & Alpena R. R.  
Bristol Railroad.  
California Southern.  
California Western Railroad & Navigation Company.  
Carolina & Yadkin River.  
Cheat Haven & Bruceton.  
Carrollton & Worthville.  
Chesapeake Western.  
Chicago, Harvard & Geneva Lake Railroad.  
Charles City Western.  
Columbia, Newberry & Laurens.  
Coudersport & Port Allegheny.  
Cumberland & Manchester.  
Delaware & Northern.  
Delaware Valley Railway.  
East Carolina.  
East Jordan & Southern.  
Eastern Kentucky Railway.  
Electric Short Line Railway.  
Erie & Michigan Railway & Navigation Company.  
Federal Valley.  
Fernwood & Gulf.  
Flint River & Northeastern.  
Florida, Alabama & Gulf.  
Fonda, Johnstown & Gloversville.  
Franklin & Pennsylvania.  
Gainesville & Northwestern.  
Garyville Northern.  
Glenmora & Western.  
Georgia Northern.  
Grasse River Railroad.  
Green County (Ga.).  
Indian Valley.  
Ironton Railroad.  
Jefferson & Northwestern.  
Kalamazoo, Lake Shore & Chicago.  
Kentucky & Tennessee Railway.  
Kentwood & Eastern.  
Kosciusko & Southeastern.  
La Crosse & Southeastern.  
Little River Railroad (Tenn.).  
Live Oak, Perry & Gulf Railroad.  
Loranger, Louisiana & Northeastern Railroad.  
Manchester & Oneida.  
Manistee & Northeastern.  
Marianna & Blountstown.  
Marion & Eastern.  
Maryland & Pennsylvania.  
Miami Mineral Belt Railroad.  
Midland & Northwestern.  
Midland Railway (Ga.).  
Minneapolis, Red Lake & Manitoba.  
Missouri Southern.  
Modesto & Empire Traction Co.  
Montana, Wyoming & Southern.  
Morehead & North Fork.  
Mount Hood Railroad.  
Mt. Jewett, Kinzua & Riterville.  
Natchez, Columbia & Mobile.  
Nevada Copper Belt Railroad.  
Newaunkum Valley Railroad.  
New Jersey, Indiana & Illinois.  
New Orleans, Natchez & Natchez.  
Northwestern Railroad of South Carolina.  
Norwood & St. Lawrence.  
Oneida & Western.  
Palatine, Lake Zurich & Wauconda Railroad.  
Paris & Mt. Pleasant.  
Pecos Valley Southern.  
Pelham & Havana Railroad.  
Pickens Railroad.  
Pittsburgh, Lisbon & Western.  
Pittsburgh & Susquehanna.  
Preston Railroad.  
Rapid Railroad.  
Rockingham Railroad.  
Randolph & Cumberland.  
Rock Island Southern.  
Rome & Northern.  
Roscoe, Snyder & Pacific.  
St. Louis, Kennett & Southeastern.  
Sand Springs Ry.  
Shearwood Railway.  
South Georgia Railway.  
South Manchester.  
Tennessee, Alabama & Georgia R. R.  
Tennessee Railroad.  
Tuskegee Railroad.  
Unadilla Valley Ry. Company.  
Ursina & North Fork.  
Valdosta, Moultrie & Western.  
Virginia Blue Ridge.  
Virginia & Truckee Railway.  
Wabash, Chester & Western.  
Washington & Choctaw.  
Washington & Lincolnton.  
Waycross & Southern.  
Western Allegheny.  
West Virginia Midland.  
White River Railroad (Vt.).  
Wildwood & Delaware Bay Shore Line.  
Willamette Valley & Coast.  
Wilmington, Brunswick & Southern Railroad.  
Williamsport & North Branch.



Photo from International Film Service.

Laclede Turns Out to Greet General Pershing





The Floor of the New York Stock Exchange

## The Railroads Facing Financial Difficulties

On the Basis of the Present Rates Many Roads Would Be  
Bankrupt Under Private Operation

OUT OF 180 ROADS earning a million dollars a year or more each, 117 operated at a cost for operation alone of 85 per cent of gross earnings, or worse, for the first ten months of 1919. The mileage of these 117 roads is about 120,000. Assuming that the net operating income of these roads averaged no higher in 1920 than it did in 1919, and that the roads were to be given back March 1, 1920, without any form of guarantee or increase in the rates, most of them would be bankrupt before the end of the year. Actual conditions, however, at the present time, are not quite as discouraging as this would seem to indicate.

The results of operation in the four months, July 1 to October 31 inclusive, have been in sharp contrast in many instances with the results for the first six months of 1919. Some of the roads that had a deficit from operation on June 30, 1919, now show something above operating expenses for the entire ten months. Only a very few roads are as bad off now as they were on June 30, 1919. On the other hand, the first six months of the year are for most roads, much less productive of net operating income than are the second six months. Were conditions in 1920 to be analogous to a year in which the roads earned as much in June 1 to October 31 as they did in 1919, it is important to note that the entire year's net would not however, be three times as great as for the four months mentioned, but would be somewhere between the net operating income as indicated by the ten months, January to October 1919, inclusive, and the four months, July to October, 1919, inclusive. In the test period the roads as a whole earned net a little over 38 per cent of

the entire year's revenue in July to October, inclusive. We can, therefore, reconstruct a year on the basis of the four months, July to October, 1919, by using the net earnings as 38 per cent of the estimated year's total. This has been done in column 4 of the table.

In the ten months of 1919 there were 48 of the Class I roads which failed to earn even their net operating expenses.

The table shows the larger and more important of the Class I roads, whose operating expenses were 85 per cent or more of their total operating revenues in the first ten months of 1919. Column 2 of this table shows the net operating income or deficit after the payment of operating expenses and taxes other than war taxes. This, of course, affects the government and not the owning corporations since the corporations are at present receiving a fixed rental for their properties from the government. The third column shows the operating income that would be earned in a full twelve months averaging the same as the first ten months of 1919. Column 4 shows the results that would be obtained in net operating income if the roads were to operate for an entire twelve months with as high an average

**E**VEN WITH the extraordinarily large earnings of the months, July to October, inclusive, and assuming that the first six months of the year were to be proportionately favorable many roads would be falling behind their fixed charges.

Few, if any, railroads can operate at 85 per cent and remain solvent for long.

Bonds of nearly all these roads and stocks of some of them were considered conservative investments.

net as that indicated by the four months from July 1 to October 3, assuming that in these months the road earned 38 per cent of the year's total. The fifth column shows the fixed charges of the owning corporations where the "other income" and rentals or other charges against the corporations do not make the comparison between net operating income and fixed charge entirely meaningless. Even, however, where this comparison is shown in the table, it does not mean that the net operating income will be the only

source of income from which the companies could have paid fixed charges, nor that the fixed charges shown are the only obligatory payments out of net.

Each road shown in the table might well be made the subject of special detailed study and even with such a study available, the estimate for 1920 earnings might conceivably fall far wide of the mark. Nevertheless, the table will repay careful study and contains some very interesting material for thought.

The Atlanta, Birmingham & Atlantic wiped off an operating deficit of over three-quarters of a million dollars for the first six months, and would, on the basis of the last four months, earn its operating expenses, although it, of course, would be bankrupt with nearly a half million dollars fixed charges unearned.

The Atlantic Coast Line is an exception to the general rule. In the first six months of 1919, it was earning at a rate which would have paid fixed charges and its regular 7 per cent dividends and left a safe margin to spare. In the last four months, it was earning at a rate which would

and the scaled down dividends on the converted leased line stock, but on the basis of the last four months, annual interest charges would have been earned more than twice over.

The Buffalo, Rochester & Pittsburgh, on the basis of the ten months showing, would have fallen far behind its operating expenses alone, but on the basis of the last four months showing, it would have earned over half a million dollars net annually. It should be said in fairness, that the Buffalo, Rochester & Pittsburgh situation was peculiar. In the first six months of 1919, the iron furnace at Punxsutawney was shut down, and the Buffalo, Rochester & Pittsburgh lost all of its southbound ore tonnage. Added to this, there was an abnormally small movement of coal.

The Chicago, Milwaukee & St. Paul is another road that on the showing of the first six months would, without government guarantees, have been headed toward bankruptcy, but which during the last four months made a remarkably good showing in net, yet is not earning its fixed charges.

The Chicago, Peoria & St. Louis situation looks almost hopelessly bad, either in the light of the first six months or

	Col. I	Col. II	Col. III	Col. IV	Col. V
	Miles	Net operating income first 10 months 1919	Net operating income 12 months on the first 10 months' basis	Net operating income 12 months on the basis of July 1-Oct. 31, 1919††	Fixed charges in 1918
Atlanta, Birmingham & Atlantic.....	638	—\$799,000	—\$959,000	\$28,000	\$482,000*
Atlantic Coast Line.....	4,857	5,542,000	6,648,000	2,631,000	6,051,000a
Baltimore & Ohio.....	5,151	6,968,000	8,352,000	27,333,000	21,952,000*b
Boston & Maine.....	2,258	4,520,000	5,412,000	11,430,000	.....
Buffalo, Rochester & Pittsburgh.....	589	—656,000	—787,000	680,000	2,205,000*
Central of Georgia.....	1,918	1,349,000	1,618,000	1,977,000	1,987,000
Central of New Jersey.....	685	2,256,000	2,707,200	3,842,000	4,038,000
Central Vermont.....	411	—735,000	—881,000	—502,000	765,000*
Chicago & Alton.....	1,050	1,243,000	1,491,000	1,749,000	3,495,000
Chicago & Eastern Illinois.....	1,131	162,000	193,000	2,763,000	4,278,000†
Chicago Great Western.....	1,496	2,062,000	2,474,000	4,519,000	1,592,000*
Chicago, Milwaukee & St. Paul.....	10,647	5,403,000	6,963,000	12,517,000	16,767,000
Chicago, Peoria & St. Louis.....	247	—625,000	—750,000	—484,000	.....
Chicago, Rock Island & Pacific.....	7,594	10,267,000	12,295,000	19,561,000	9,518,000
Chicago, St. Paul, Minneapolis & Omaha.....	1,749	2,604,000	3,125,000	385,000	2,260,000
Cincinnati, New Orleans & Texas Pacific.....	337	655,000	786,000	—1,178,000	2,518,000*
Delaware & Hudson.....	875	2,206,000	2,647,000	4,338,000	2,938,000‡
Denver & Salt Lake.....	255	—717,000	—860,000	—394,000	490,000¶
Detroit, Toledo & Ironton.....	456	—407,000	—487,000	21,000	.....
Duluth, South Shore & Atlantic.....	599	184,000	221,000	625,000	1,041,000
Erie.....	1,989	503,000	603,000	7,536,050	10,449,000
Florida East Coast.....	764	963,000	1,155,000	960,000	1,200,000
Illinois Central.....	4,791	4,844,000	5,808,000	7,327,000	8,478,000  c
International & Great Northern.....	1,159	—1,046,000	—1,255,000	—967,000	.....
Lehigh Valley.....	1,435	3,314,000	3,978,000	6,831,000	7,755,000*
Louisville & Nashville.....	5,013	9,589,000	11,508,000	15,429,000	7,450,000
Maine Central.....	1,216	—928,000	—1,114,000	—234,000	806,000
Minneapolis & St. Louis.....	1,645	254,000	304,400	1,666,000	2,060,000
Missouri Pacific.....	7,108	6,480,000	7,776,000	13,135,000	12,605,000
Nashville, Chattanooga & St. Louis.....	1,247	122,000	147,000	452,000	1,350,000*
New York, New Haven & Hartford.....	1,965	8,317,000	9,977,000	17,581,000	18,792,000*
Pennsylvania Railroad.....	5,361	19,550,000	23,460,000	42,352,000	.....
Pennsylvania Company.....	1,754	8,566,000	10,254,000	16,435,000	.....
Pittsburgh, Cincinnati, Chicago & St. Louis.....	2,383	2,964,000	3,557,000	5,285,000	.....
Philadelphia & Reading.....	1,127	6,229,000	7,476,000	12,938,000	.....
Rutland.....	415	86,000	108,400	422,000	476,000
St. Louis-Southwestern.....	939	2,342,000	2,810,000	3,436,000	.....
St. Louis-Southwestern of Texas.....	814	—1,004,000	—1,371,200	—518,000	2,265,000
Seaboard Air Line.....	3,563	2,155,000	2,486,000	2,705,000	4,591,000*
Southern Railway.....	6,982	9,280,000	11,135,500	17,140,000	11,855,000
Wabash.....	2,503	2,823,000	3,385,000	3,968,000	3,093,000
Western Maryland.....	700	40,000	47,500	1,110,000	2,310,000

NOTE.—This table shows only the larger of the 117 roads operating above 85 per cent in 1919.

\*This includes rentals.

(a) The A. C. L. had in 1918 \$1,318,000 income other than from operation, and received \$2,570,000 dividends from its Louisville & Nashville stock.

(b) The Baltimore & Ohio had \$5,201,000 income other than from operation in 1918.

(c) In 1917 the Illinois Central had \$8,009,000 income other than from operation.

†In addition to the interest charges, rentals amount to \$1,017,000.

‡This does not include \$143,000 other interest and \$1,947,000 rentals, but neither does the estimated operating income include other income or income from the mining of coal which in the total in 1918 amounted to over \$3,188,000.

¶This is the 1917 figure, no 1918 figure being available.

||Does not include \$2,276,000 rentals of leased roads. On the other hand it is interest charges for the entire system of 2,257 miles while income is for 1,989 miles only.

††See text for method of calculating.

have only left two and one-half million dollars over and above actual operating expenses, and it could not have paid from earnings alone half of its fixed charges.

The Baltimore & Ohio, on the other hand, on the basis of the first six months, appeared to be pretty surely insolvent. On the basis of ten months, it would have fallen far short of earning fixed charges, but on the basis of the last four months, it would have paid its operating expenses, but would have barely earned its fixed charges.

The Boston & Maine showing is also striking. Its ten months earnings would have barely paid interest charges

the last four months. Even on the basis of the last four months, the road would have fallen more than a half a million dollars behind its operating expenses.

The Delaware & Hudson, another strong, rich road, had it been dependent on railroad earnings alone, would have fallen behind its interest charges on the basis of the ten months, but on the basis of the last four months, would have earned sufficient from its railroad operations to pay not only its fixed charges, but also probably from its railroad operations and coal mining operations, its regular 9 per cent dividends as well.



## Curtailed Construction Activities Mark the Year



Low Record Established for Mileage of New Lines Completed  
Is Indicative of 1919 Tendencies

**D**URING 1919 a total of 685.98 miles of new railway lines was completed and placed in service in the United States and 433.31 miles in Canada. This establishes a new low record for the United States, as the 1919 mileage built is less by 36 miles than the previous low mark for any year since the Civil war, of 722 miles established in 1918.

On the other hand, the mileage built in Canada is three times that of the previous year and is larger than that for any year since 1915, although it is only a fraction of the mileage built in 1913, when the new construction totaled almost 3,000 miles. The marked contrast between the stagnation in the development of railway lines in this country and the resumption of construction in Canada is a reflection of the difference in conditions under which the roads in these respective countries are laboring.

In multiple track construction the 405.32 miles of second track completed in the United States in 1919 is comparable with 681 miles completed in 1919. During 1919, 27.54 miles of third main track and 16.84 miles of fourth or multiple main tracks were completed in the United States as compared with 77 miles and 57 miles respectively in the previous year. Canada reported 9.15 miles of second track completed during the year.

The tendency toward restricted expenditures shown in the mileage reports is also reflected in other construction activities. The estimated cost of all work to be done on Class I roads during 1919, exclusive of equipment, totaled \$413,626,354 of which amount only \$153,999,684 was authorized during the year, the remainder representing the carry-over from appropriations made in 1918. Equating for present

standards of money, last year's work is equivalent to an expenditure of less than \$250,000,000 in pre-war dollars.

Very nearly 50 per cent of the total expenditures authorized for additions and betterments on Class I roads during 1919 was for improvements to existing roadway and tracks;

approximately 33 per cent was for terminal improvements and 16 per cent for additional trackage, the remainder coming under the head of miscellaneous work.

During the year less than \$4,569,138 was appropriated by Class I roads for extensions, branches and other new lines. This is indicative of the tendency towards the intensive rather than the extensive development of the more important lines of our transportation system.

Generally speaking, the year has been devoted to the completion of projects under way rather than to the inception of new programs. For this reason in the list of important projects under way, appended to this article, no attempt has been made to segregate the purely 1919 projects. On the contrary, the list includes all the projects carried over from 1918,

which were reported less than 85 per cent completed on January 1, 1919, after excluding all those on which work has been suspended during the year.

A study of those projects which have been carried on under the direction of the Railroad Administration will show that the policy adopted during the war of concentrating attention primarily on that work most needed to increase the capacity of the lines rather than to promote economy of operation has been continued during 1919. As a result almost no work has been done towards the reduction of grades or the provision of additional facilities not actually required to eliminate

### **M**ILEAGE CONSTRUCTED in the United States during 1919 the lowest for any year since the Civil War.

Mileage in Canada larger than for the three preceding years, but far below the average prior to that date.

Multiple main track construction in United States also shows decrease.

1919 construction characterized by completion of projects already under way rather than by inauguration of new programs. Largely devoted to construction of engine and terminal facilities.

congestion. There has also been an almost complete cessation of the construction of classification yards, freight houses and stations and of terminal facilities other than those re-

of the table showing its geographic distribution, it is apparent that a considerable portion was built in connection with the development of coal and oil lands.

## NEW TRACK BUILT IN 1919

	No.	Cos.	MILES				Total
			building	First track	Second track	Third track	
UNITED STATES—							
Alabama	2		11.50	29.70			41.20
Arizona	4		32.40	3.13			35.53
Arkansas	1		2.00				2.00
California	2		69.29				69.29
Colorado	1			20.00			20.00
Delaware	1			8.00			8.00
Florida	1		17.60				17.60
Georgia	2		14.00	12.64			26.64
Idaho	1		4.00				4.00
Illinois	1		6.50	7.81			14.31
Indiana	1			9.00			9.00
Iowa	1		.75				.75
Kansas	2		35.34	48.97	5.64		89.95
Kentucky	4		48.94	30.55			79.49
Louisiana	1		.39				.39
Maine	1		.50				.50
Maryland	1		.75				.75
Mississippi	3		62.50				62.50
Nevada	1		2.26				2.26
New Jersey	2		2.62			21.90	37.92
North Carolina	1			41.00			41.00
Ohio	1		4.08			3.44	7.52
Oklahoma	4		91.60	7.05			98.65
Oregon	3		51.90				51.90
Pennsylvania	2		36.68	6.98			43.66
South Carolina	1			86.35			86.35
Tennessee	2		23.50	23.36			46.86
Texas	3		86.00	10.50			96.50
Utah	1		10.50	15.82			26.32
Virginia	1		42.00				42.00
West Virginia	2		24.00				24.00
Wyoming	1		4.38	44.46			48.84
Totals	54		685.98	405.32		27.54	1,135.68
Canada	6		433.31	9.15			442.46

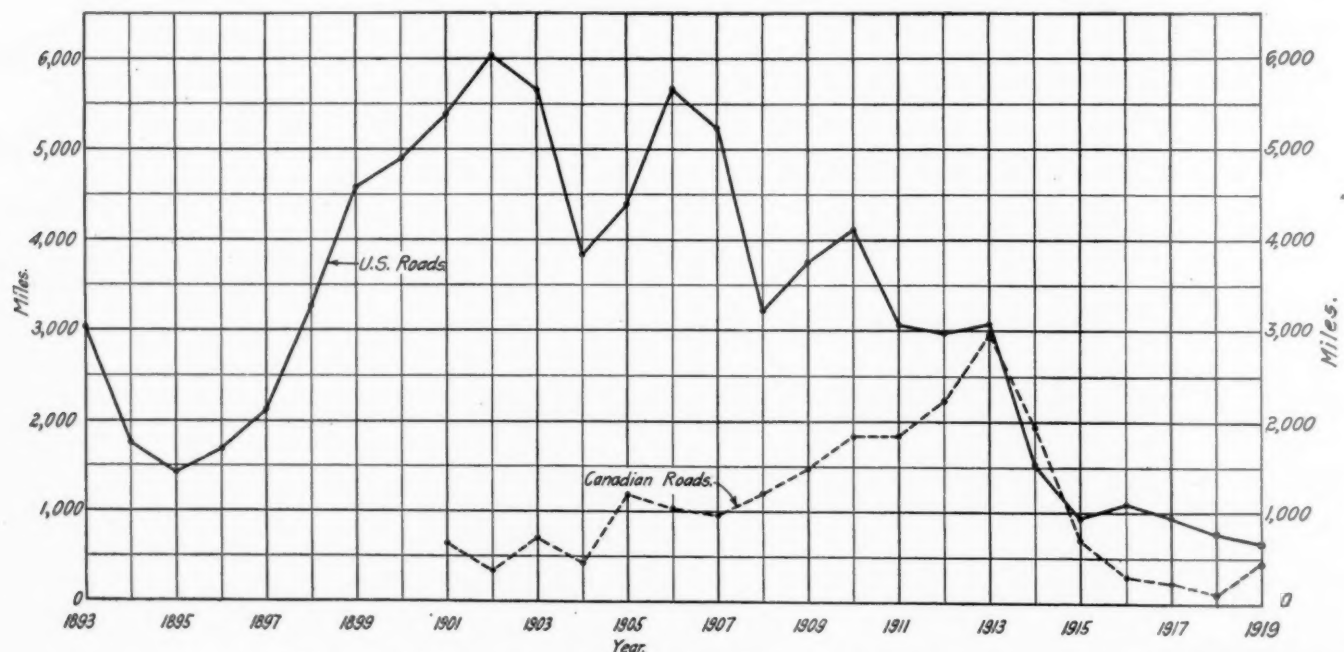
## NEW TRACK BUILT IN 1918

	No.	Cos.	MILES				Total
			building	First track	Second track	Third track	
UNITED STATES—							
Alabama	1		7.60				7.60
Arizona	1		55.00	1.97			56.97
Alaska	1		53.00				53.00
California	3		40.09	60.77			100.86
Colorado	3		9.55	4.87			14.42
Connecticut	1					2.00	2.00
Florida	4		104.78	1.75			106.53
Georgia	2		15.10	23.50			38.60
Idaho	1		10.84				10.84
Illinois	3		5.40	23.37	3.00	18.00	49.77
Indiana	1		42.10	23.70	6.34		72.14
Iowa	1			9.12			9.12
Kansas	2		34.80	37.45	6.45		78.70
Kentucky	1		12.28	9.00			21.28
Louisiana	1		3.00	3.01			6.01
Maryland	1		6.20	7.87	2.83	4.27	21.17
Maine	1		0.71	7.47	5.96	0.36	14.50
Massachusetts	1		0.17	2.42	4.44	0.50	7.53
Michigan	1			0.66			0.66
Minnesota	1			43.49	4.26	4.25	52.00
Mississippi	1		30.00	8.80			38.80
Missouri	1		1.01	13.27			14.28
Montana	1			57.71	1.07	1.16	59.94
Nebraska	1			13.58			13.58
New Jersey	2		5.93	7.24	4.33	5.78	23.28
New Mexico	1			12.08			12.08
New York	5		6.57	30.31	12.29	4.89	54.06
North Carolina	2		6.30	15.83			22.13
North Dakota	1			4.36			4.36
Ohio	1		8.00	94.70	19.20	15.62	137.52
Oklahoma	2		6.28				6.28
Oregon	3		8.91				8.91
Pennsylvania	7		45.80	34.03	6.78	0.60	87.21
South Carolina	1		38.80	41.72			80.52
Tennessee	2		20.00	4.00			24.00
Texas	3		39.70	20.96			60.66
Utah	2		16.13				16.13
Virginia	2		11.38	8.00			19.38
Washington	2		7.53	2.30			9.83
West Virginia	5		60.57	32.19			92.76
Wisconsin	1		5.00				5.00
Wyoming	2		3.01	20.05			23.06
Totals	70		721.57	681.55	76.95	57.43	1,537.50
Canada	1		135.08	4.28			139.36
Mexico	1		10.00				10.00

quired to repair and maintain the motive power and equipment.

Most of the mileage of new lines completed during 1919 was in comparatively short sections; Oklahoma led this country with 91.60 miles, Texas was second with 86 miles, and California was third with 69.29. From an examination

In second-track construction South Carolina led the country with 86.35 miles. It is interesting to note that all this mileage was built by one company, the Southern, and that the adjoining state of North Carolina shows 41 miles completed by the same company. The mileage built by the Southern in these states last year, together with a short sec-



Curves of Mileage Built in the United States and Canada Since 1893



tion in Georgia, marks the completion of a project undertaken 17 years ago to provide this road with a double-track line between Atlanta, Ga., and Washington, D. C.

The signing of the armistice late in 1918 brought to a close the war's emergency under which much of the 1918 work was undertaken. This was followed by a period of

will see the inauguration of a development program designed to supply the deficiencies is an open question, dependent on the final disposition of the roads and the promptness with which the decision is reached.

The amplification of engine terminal facilities has been the outstanding feature of the year's activities. During the year the Baltimore & Ohio completed and placed in service its heavy repair shop at Glenwood, Pa., at a cost of \$1,732,605. The Boston & Maine completed three projects for improved engine house and yard facilities, at a cost exceeding \$500,000 for each project, while the Union Pacific carried on an extensive program of terminal rehabilitation. These particular projects are cited as typical of what many roads have been doing along this line.

With exceptions, notably in Indianapolis, Ind., very little grade separation work has been done during the year. The same may be said in regard to new passenger stations, although the Jacksonville (Fla.) terminal station and its auxiliary facilities were completed and placed in service late in 1919.

In Canada the work on the Toronto terminal station is progressing, and the Grand Trunk Pacific line diversion project at Firdale, Manitoba, involving an expenditure in excess of \$420,000, is 67 per cent complete.

MILES OF NEW LINE COMPLETED IN THE UNITED STATES SINCE 1893			
1894.....	1,760	1907.....	5,212
1895.....	1,420	1908.....	3,214
1896.....	1,692	1909.....	3,748
1897.....	2,109	1910.....	4,122
1898.....	3,265	1911.....	3,066
1899.....	4,569	1912.....	2,997
1900.....	4,894	1913.....	3,071
1901.....	5,368	1914.....	1,532
1902.....	6,026	1915.....	933
1903.....	5,652	1916.....	1,098
1904.....	3,832	1917.....	979
1905.....	4,388	1918.....	721
1906.....	5,623	1919.....	686

uncertainty surrounding the return of the roads to private control. These factors had a direct bearing on the appropriations for construction during the year, curtailment being the natural result. With the carry-over projects, however, the year may be said to have been a fairly busy one, although it is common knowledge that the end of the year found the roads sadly in need of additional facilities. Whether 1920

### Railroad Construction in the United States in 1919

#### Alabama Great Southern

*Second Track:* Through Burstall, Ala., and Vance, 29.70 miles.

#### Americus & Atlantic

*First Track:* Between Mata, Ga., and Methvins, 4.00 miles.

#### Apache Railway

*First Track:* In Arizona, not specified, 17.50 miles.

#### Atchison, Topeka & Santa Fe

*First Track:* Extension Bartlesville (Okla.) branch, mile post 84 to Tulsa, Okla., Holywood, Kan., to Galatia, 30 miles; Shattuck, Okla., to Spearman, Tex., 70 miles in Tex., 14 miles in Okla., total 84 miles.

*Second Track:* In Arkansas City, Kan., 2.88 miles; Eldorado, Kan., to Augusta, 9.90 miles; Winfield Junction, Kan., to South Winfield, 0.85 miles; South Winfield, Kan., to Arkansas City, 12.30 miles; Arkansas City, Kan., to Oklahoma State line 2.54 miles; state line to Newkirk, Okla., 7.05 miles.

*Third Track:* Turner, Kan., to Holliday, 5.64 miles.

*Other Important Work Under Construction:* New subway at State street, Emporia, Kan., cost \$133,304, completed; new yard and coach cleaning facilities at Argentine, Kan., cost \$148,947, and transfer freight house cost \$150,264, completed; additional yard tracks at Augusta, Kan., cost \$127,810 completed; yard changes at Guthrie, Okla., cost \$149,901, completed; additional yards at Cushing, Okla., cost \$185,321, completed; change of grade and alignment from Kansas-Oklahoma state line to Newkirk, Okla., cost \$124,215, completed; additional yard track and station facilities at Richmond, Cal., cost \$252,043, completed; additional water service at Seligman, Ariz., cost \$116,088, 80 per cent completed; reservoir at Winslow, Ariz., 30,000,000 gal. capacity, cost \$156,000, completed; Minkler Southern, building from Porterville, Cal., to Denver, 12.47 miles and 2 miles spur track, cost \$541,297, 40 per cent completed.

#### Atlantic Coast Line

*First Track:* Between Palmdale, Fla., and Immokalee, 17.60 miles.

*Other Important Work Under Construction:* Additional freight facilities at Richmond, Va., cost \$360,882, completed.

#### Baltimore & Ohio

*Other Important Work Under Construction:* Heavy repair shops at Glenwood, Pa., completed; water type ash pit at Glenwood, cost \$117,400, completed; heavy repair shop at Cumberland, Md., completed; steel car repair shop at Mt. Clare, Md., cost \$103,815, completed; Allegheny river bridge at Pittsburgh, Pa., cost \$2,560,000, 15 per cent completed; bridge 66 on Pittsburgh division at Highland, Pa., cost \$149,000, completed; classification yard at Elsmere Junction, Del., cost \$116,657, completed; engine terminal improvements at Lorain, Ohio, cost \$11,790, nearing completion; relocation of main tracks between North Dayton and Tippecanoe City, Ohio, cost \$474,912, 90 per cent completed; improvements to engine house at South Chicago, Ill., cost \$106,700, completed; engine house facilities at Storrs, Ohio, cost \$100,500, 70 per cent completed; arch bridge at Painesville, Ohio, cost \$102,500, 15 per cent completed.

#### Bessemer & Lake Erie

*Second Track:* Between K. O. Junction and Kremis, Pa., 6.98 miles.

*Other Important Work Under Construction:* Strengthening bridge No. 1 at Butler, Pa., cost \$116,000, completed.

#### Birmingham, Selma & Mobile

*First Track:* Stewart to Jericho, Ala., 3.50 miles.

#### Black Mountain Railroad

*First Track:* Hulen, Ky., to Packetts Creek, 8 miles.

#### Boston & Albany

*Other Important Work Under Construction:* Renewal of bridge at Westfield, Mass., cost \$250,000, 60 per cent completed; important freight and passenger facilities at Springfield, Mass., cost \$750,000, 10 per cent completed; reconstruction of drawbridge at Chelsea, Mass., cost \$280,302, 80 per cent completed.

#### Boston & Maine

*Other Important Work Under Construction:* Rebuilding bridge No. 180 at Zoar, Mass., cost \$215,000, completed; engine house and yard facilities at Rotterdam, N. Y., cost \$643,000, engine house facilities completed, yard facilities deferred; engine house and yard facilities at Lowell, Mass., completed, except signals which are deferred; engine house facilities at Dover, N. H., cost \$460,000, completed; engine house facilities at Deerfield, Mass., cost \$800,000, completed; additional yard facilities at Haverhill, Mass., cost \$380,000, now in service; engine house improvements at East Somerville, Mass., cost \$125,000, completed; diverting Hoosack river at Pownal, Vt., cost \$290,000, completed; renewing bridge No. 35 at Haverhill, Mass., cost \$446,300, to be completed by April, 1920.

#### Buffalo Northwestern

*First Track:* Waynoka, Okla., to Buffalo, 50.00 miles.

#### Cairo, Truman & Southern

*First Track:* In Arkansas, not specified, 2.00 miles.

#### Canton Railroad

*First Track:* In Maryland, not specified, 0.75 miles.

#### Central Railroad of New Jersey

*First Track:* In New Jersey, branch to Federal Ship Yard, 0.62 miles.

*Other Important Work Under Construction:* Renewal bridge No. 1 and widening bridge No. 2 at Easton, Pa., cost \$475,642, completed; storage yard at pier 18 Jersey City, N. J., cost \$828,686, completed; coal pier 18 and power house at Jersey City, cost \$2,102,542, completed; coal thawing shed at pier 18 Jersey City, cost \$370,000, completed; additional track and yard changes at Allentown, Pa., cost \$397,456, completed; renewal of bridge No. 214 at East Rahway, N. J., cost \$397,571, and renewal of bridge No. 217 at Maurer, N. J., cost \$568,269, to be completed by September, 1920.

#### Chesapeake & Ohio

*First Track:* Matha, W. Va., to Man. 13.00 miles; from Barnabas, W. Va., 3.00 miles; Ward, Ky., up Greasy Creek, 3.50 miles.

*Other Important Work Under Construction:* Fire protection on pier 4, automatic sprinkler system, cost \$103,000, completed; west bound yard at Fulton, Va., cost \$309,000, completed; extension to east bound yard at Hinton, W. Va., cost \$302,300, to be completed by March, 1920; passing sidings at Whiteside, W. Va., cost \$106,000, completed; renewal of bridge No. 44 at Clover Valley, W. Va., cost \$153,516, completed; renewal of bridge No. 66 at Martha, W. Va., cost \$135,678, completed; additional west bound yard at Russell, Ky., completed; water station at Silver Grove, Ky., cost \$173,000, completed; shop facilities at Huntington, W. Va., cost \$701,400, completed.

#### Chicago & Alton

*Other Important Work Under Construction:* Freight terminal at Kansas City, Mo., cost \$148,828, completed; freight terminal at Chicago cost \$1,400,000, work started.

**Chicago & North Western**

*Other Important Work Under Construction:* Minnesota river bridge No. 1603 at Mankato, Minn., cost \$125,700, completed; bridge No. 1890 at Lick, Ill., cost \$139,100, to be finished by June, 1920; passenger station at Clinton, Iowa, cost \$282,000, completed.

**Chicago, Burlington & Quincy**

*Second Track:* Litchfield, Ill., to Walshville, 7.81 miles.

*Other Important Work Under Construction:* New Platte river bridge at Northport, Neb., cost \$198,950, to be finished June, 1920; track elevation at Aurora, Ill., to cost \$1,079,874; yard at Hawthorne, Ill., cost \$259,332, completed; engine terminal at Eola, Ill., cost \$183,603, completed; freight terminal at Chicago, cost \$3,420,942, work under way; reservoir and pipe line at Edgemont, S. Dak., cost \$125,161, completed; additional shop facilities at West Burlington, Iowa, cost \$245,187, completed.

**Chicago, Rock Island & Pacific**

*First Track:* Chattanooga, Okla., to Grandfield, 18.00 miles.

*Other Important Work Under Construction:* Rebuilding bridge No. 5303 on Nebraska line, cost \$114,832, 5 per cent completed; freight treating plants on Iowa division, cost \$102,303, completed; new engine terminal at Burr Oak, Ill., cost \$269,700, completed.

**Cincinnati, New Orleans & Texas Pacific**

*Second Track:* Kings Mountain, Ky., to Science Hill, 14.70 miles; Moreland, Ky., to South Fork, 8.30 miles; Helenwood, Tenn., to Robbins, 6.00 miles; from Huffman, Tenn., 17.36.

**Cisco Northeastern**

*First Track:* In Texas, not specified, 10 miles.

**City of Prineville Railway**

*First Track:* Prineville Junction, Ore., to Prineville, 19 miles.

**Cleveland, Cincinnati, Chicago & St. Louis**

*Second Track:* Briar, Ind., to Beach Grove, 9.00 miles.

*Other Important Work Under Construction:* Yard extension at Mattoon, Ill., cost \$115,000, work completed except track; second track from Augusta, Ind., to Whitehaven, 11 miles, cost \$1,158,900, grading and bridges, completed.

**Delaware & Hudson**

*Other Important Work Under Construction:* Yard improvements at Carbondale, Pa., cost \$689,946, completed.

**Delaware, Lackawanna & Western**

*Other Important Work Under Construction:* Renewal of bridge abutments, mile post 293.56 at Avoca, N. Y., cost \$11,817, 70 per cent completed; Sanfords crossing viaduct at Kearney Junction, N. J., cost \$192,050, work under way.

**Denver & Rio Grande**

*Second Track:* Buttes, Colo., to Pueblo, 20.00 miles.

*Other Important Work Under Construction:* Division yard and terminals at Soldier Summit, Utah, cost \$880,000, completed.

**De Queen & Eastern**

*Other Important Work Under Construction:* Broken Bow, Okla., and De Queen, Ark.

**Duluth, Missabe & Northern**

*First Track:* In Minnesota, Spur to Carson Lake; Spur to Hobart, Minn.

**Elk Basin Railroad**

*First Track:* Clarkia, Idaho, to Camp 16, 4.00 miles.

**Erie**

*Other Important Work Under Construction:* Separation of grades, Youngstown, Ohio, cost \$147,800, completed; separation of grades, Girard, Ohio, cost \$150,000, completed; engine terminal, Avoca, Pa., cost \$294,000, completed; engine terminal, Brockwayville, Pa., cost \$142,445, completed; engine terminal, Salamanca, N. Y., cost \$237,293, completed.

**Fort Worth & Denver City**

*Other Important Work Under Construction:* Freight station at Wichita Falls, Tex., cost \$114,443, 15 per cent completed.

**Goshen Valley**

*First Track:* Pearl, Utah, to Flora, 10.50 miles.

**Great Northern**

*Other Important Work Under Construction:* Renewing 858 feet of single track timber, snow sheds and 1412 feet of double track sheds, Leavenworth, Wash., to Drury and at Tye, cost \$300,000, completed.

**Gulf & Ship Island**

*First Track:* From Hovey, Miss., to Kihm, 34.50 miles.

**Gulf, Colorado & Santa Fe**

*Other Important Work Under Construction:* Galveston (Tex.) Causeway (G. C. & S. F. share) \$305,151, 60 per cent completed; raising grade main line Texas, fourth district mile post 330-409, cost \$197,926, 80 per cent completed.

**Gulf, Mobile & Northern**

*First Track:* Between Barrets divide and Jackson, Tenn., 22.00 miles; McLain Junction, Miss., to North Blodgett, 24.40 miles.

**Horse Creek Railroad**

*First Track:* In Clay county, Ky., up Horse Creek, 4.70 miles.

**Houston & Texas Central**

*First Track:* Around Dallas, Tex., 6.00 miles.

**Illinois Central**

*First Track:* Golconda, Ill., extension on Golconda branch, 6.50 miles; Golconda extension to Rose Clare and Fairview mines.

*Other Important Work Under Construction:* At Chicago reconstruction of bridges from Sixty-third to Sixty-seventh streets, inclusive, cost \$537,000, and from Fifty-first to Sixtieth streets, inclusive, cost \$821,850, completed; raising tracks from Sixty-third to Sixty-seventh streets, cost \$140,800, nearing completion; raising tracks from Fifty-first to Sixty-third streets, cost \$286,000, completed; passenger stations at Fifty-third, Fifty-seventh and Sixtieth streets, cost \$115,870, completed; reconstruction St. Charles Air Line bridge, cost \$151,420, completed; power plant at Burnside shops, cost \$169,918, completed; track elevation Grand Crossing to Kensington, cost \$2,082,300, completed. Four-track bridge over Kankakee river at Kankakee, Ill., cost \$346,357, completed; water facilities at DuQuoin, Ill., cost \$100,000, completed; engine terminal at Mounds, Ill., cost \$250,000, and overhead bridge and yard tracks, cost \$172,000, completed; reduction of grade and change of alignment from Princeton, Ky., to Dawson, cost \$802,000, completed.

**Kansas City Southern**

*First Track:* Asbury, Mo., to Lawton, Kan., 5.34 miles.

**Knox Railroad**

*First Track:* Between Union, Maine, and Warren, 0.50 miles.

**Lake Erie & Western**

*Other Important Work Under Construction:* Roundhouse at Lima, Ohio, cost \$250,000, completed; roundhouse facilities at Peru, Ind., cost \$156,510, completed; track elevation and freight house at Indianapolis, Ind., cost \$900,000, to be completed in 1920.

**Lehigh Valley**

*Other Important Work Under Construction:* Hamburg Turnpike viaduct, cost \$216,013, completed; changes account barge canal at Rochester, N. Y., cost \$100,000, completed; engine terminal at Ashmore, Pa., cost \$1,630,000, completed.

**Louisville & Nashville**

*First Track:* Lexington & Eastern, Blackey, Ky., up Rockhouse Creek, 3.66 miles. Branch in Perry county, 7.81 miles; Kentucky & Virginian, from Evarts, Ky., 2.80 miles; extension of Clover Fork branch, 9.77 miles; extension to Martin's Fork branch, 2.70 miles; in Harlan county up Capon's Creek, 6.00 miles.

*Second Track:* Corbin, Ky., to Arkle, 7.55 miles.

**Magna Arizona Railroad**

*First Track:* In Superior, Ariz., 10.63 miles.

**Michigan Central**

*Other Important Work Under Construction:* Engine terminal at Niles, Mich.; cost \$1,378,500, completed; extending dock at harbor line at Detroit, cost \$326,000.

**Minneapolis, St. Paul & Sault Ste. Marie**

*Other Important Work Under Construction:* Twenty-four foot concrete arch bridge at Blackhoof, Minn., cost \$131,971, 40 per cent completed.

**Missouri, Kansas & Texas**

*Second Track:* Through Burk-Burnett, Tex., 10.50 miles.

*Other Important Work Under Construction:* Subway at Main street, Parsons, Kan., cost \$167,500, completed.

**Missouri, Kansas & Texas of Texas**

*Other Important Work Under Construction:* Separation of grades, Dallas, Tex., cost \$394,085, completed; double track through Burk-Burnett, Tex., mile post 11.95-16.10, 65 per cent of track laid.

**Missouri Pacific**

*Other Important Work Under Construction:* Raising track, Inter-River Drainage district, Poplar Bluff to Fisk, Mo., cost \$225,878, 20 per cent completed.

**Monongahela Railroad**

*Other Important Work Under Construction:* Retaining wall at Hill street, Brownsville, Pa., cost \$308,500, completed.

**Nashville, Chattanooga & St. Louis**

*Other Important Work Under Construction:* Engine terminal at Atlanta, Ga., cost \$360,030, completed.

**New York Central**

*Other Important Work Under Construction:* At New York, Grand Central Terminal improvements, cost \$3,651,805, 86 per cent completed; strengthening Park avenue viaduct, cost \$121,600, 79 per cent completed; reconstruction of 149th street bridge, cost \$449,900, 55 per cent completed, and reconstruction of Gun Hill Road bridge, cost \$108,500, 57 per cent completed. Reconstruction of bridge 698-c at Rochester, N. Y., cost \$128,450, 76 per cent completed. Elimination of grade crossings at Glasgow, Sodus, Waterloo and Mill streets, Clyde, N. Y., cost \$195,021, completed; at Hotel avenue, Niagara Falls branch, Buffalo, N. Y., cost \$400,390, completed, and at Court street, Watertown, N. Y., cost \$130,000, 24 per cent completed. Third and fourth track, Syracuse Junction branch, Syracuse, N. Y., cost \$460,000, 70 per cent completed; Solvay engine house, Syracuse, cost \$900,000, 26 per cent completed; new engine house terminal at Watertown, N. Y., cost \$1,363,000, completed; addition to Massey street yard, Watertown, cost \$120,000, 45 per cent completed; extending car repair shop at East Buffalo, N. Y., cost \$694,100, 88 per cent completed; additional eastbound yard at Minoa, N. Y., cost \$250,000, 93 per cent completed; engine house extension and alterations at



Minoa, cost \$347,000, completed; engine house improvements at De Witt, N. Y., cost \$250,000, completed; additional yard tracks at Genesee Junction, N. Y., cost \$246,000, 85 per cent completed; new yard west of Tower 4, at West Albany, N. Y., cost \$546,107, 90 per cent completed; general improvements at Utica, N. Y., cost \$297,946, 70 per cent completed; engine terminal and yard improvements at Gardenville, N. Y., cost \$2,672,200, completed; change of alignment, elimination of grade crossings and changing bridges at Tonawanda, N. Y., cost \$2,939,092, 75 per cent completed; extension to New Jersey Junction railroad tracks at West New York, N. J., cost \$404,020, 52 per cent completed; third and fourth tracks, Granton to Little Ferry, N. J., cost \$723,126, 64 per cent completed; extension of yard at Little Ferry, N. J., cost \$313,535, 90 per cent completed; ice house and repair yard at Weehawken, N. J., cost \$468,400, completed; pier K4 at Weehawken, cost \$1,036,000, completed; freight repair shop facilities at New Durham, N. J., cost \$200,000, 70 per cent completed; additions and extensions to engine house at Clearfield, Pa., cost \$157,000, completed; additions to engine house facilities at Cherry Tree, Pa., cost \$176,000, completed; additional shop facilities at Avis, Pa., cost \$855,000, completed; extending passing sidings from Shawsville Tunnel to Walton, Pa., cost \$150,000, completed; Himrod avenue viaduct improvements at Youngstown, Ohio, cost \$310,285, 34 per cent completed; grade separation at Port Clinton, Ohio, cost \$135,684, 30 per cent completed; enlargement of yard tracks at Coalbury, Ohio, cost \$531,607, completed; new engine terminal at Coalbury, cost \$950,000, completed; engine terminal and yard improvements at Collinwood, Ohio, cost \$206,508, completed; extension to locomotive shops at Collinwood, cost \$388,258, and extension to car shops, cost \$65,000, completed; new yard at Rockport, Ohio, cost \$960,885, 82 per cent completed; industrial track development and additions to Kinsman street yard, cost \$212,310, 60 per cent completed; new yard and engine terminal at Minerva, Ohio, cost \$1,068,000, completed; additional tracks and office at Indiana Harbor, Ind., cost \$100,000, 90 per cent completed; grade separation at Detroit, Mich., cost \$267,589, nearing completion; renewal of River Rouge drawbridge at Detroit, cost \$270,500, 15 per cent completed.

#### New York, Chicago & St. Louis

*Other Important Work Under Construction:* Yard extensions at Bellevue, Ohio, cost \$133,787, completed.

#### New York, New Haven & Hartford

*Other Important Work Under Construction:* Thames river bridge at New London, Conn., cost \$2,740,000, completed; freight terminal and classification yard, etc., at Cedar Hill, Conn., cost \$4,663,475, 67 per cent completed, of which 5 per cent was done in 1918, work progressing; passenger station at New Haven, Conn., cost \$1,902,213, nearing completion.

#### Norfolk & Western

*Other Important Work Under Construction:* Coal handling machinery, pier No. 3, Lamberts Point, Va., cost \$400,000, completed; engine terminal and yard facilities at Roanoke, Va., cost \$1,710,000, work under way.

#### North Texas & Santa Fe

*First Track:* From Shattuck, Okla., Ellis county, 9.60 miles.

#### Oregon, California & Eastern

*First Track:* Klamath Falls, Ore., to Daisy, 20 miles.

#### Pearl River Valley

*First Track:* Between Dalton, Miss., and Anderson, 3.60 miles.

#### Pennsylvania Railroad, Lines East

*First Track:* Turtle Creek, Pa., branch extension, 8.40 miles; Champion, Pa., through Clarksville, 9.10 miles; at Steelton, Pa., 0.85 miles; at Leechburg, Pa., 0.22 miles; Dunning, Pa., to Saltsburg, 7.24 miles; Millsboro, Pa., to Mother, 7.98 miles.

*Second Track:* Harrington, Del., to Greenwood, 8.00 miles.

*Other Important Work Under Construction:* Revision and enlargement of yard at Meadows, N. J., cost \$1,487,121, 52 per cent completed; relocation of passenger and freight station and yards at Princeton, N. J., cost \$479,152, 90 per cent completed; westbound receiving and classification yard and transfer facilities at Waverly, N. J., cost \$1,507,210, 44 per cent completed; construction of new No. 1 and No. 4 tracks from south end of Gunpowder river bridge, Maryland, to north end of Bayview yard, cost \$1,290,983, 76 per cent completed; extension of No. 1 track from Severn tower to Arundel tower, between Baltimore and Washington, cost \$456,845, 70 per cent completed; new pier and grain elevator, (Canton) Baltimore, Md., cost \$4,977,707, 62 per cent completed; brick freight house at Washington, D. C., cost \$107,000, completed; new locomotive shops, etc., at Marietta, Pa., cost \$4,996,000, 1 per cent completed; additional engine house facilities at Shire Oaks, Pa., cost \$543,021, completed; freight station and delivery tracks at Harrisburg, Pa., cost \$637,874, 89 per cent completed; extension to engine house at Gray's Ferry yard, Philadelphia, Pa., cost \$196,874, completed; two additional tracks from Fifty-eighth street, Philadelphia, to Gray's Ferry, cost \$841,358, 80 per cent completed; Sixtieth street branch, Fifty-eighth street to junction with Chester & Philadelphia branch, cost \$1,889,463, 50 per cent completed; bridges on Sixtieth street branch, Philadelphia, cost \$190,446, 82 per cent completed; new engine house, machine shop and ash handling facilities at Greenwich, Pa., cost \$1,410,790, 85 per cent completed; two-track joint line, Broad street to Delaware avenue and Hoyt street, South Philadelphia, cost \$260,700, 60 per cent completed; underground bridge at Station avenue, Cornwells, Pa., cost \$204,571, 19 per cent completed; overhead bridge at Edgely, Pa., cost \$197,123, completed; new bridge at Red Bank, Pa., cost \$418,596, completed; new bridge at Parker's Landing, Pa., cost \$556,625, 75 per cent completed; new bridge at East Sandy, Pa., cost \$432,179, completed; new bridge at Mahoning, Pa., cost \$432,504, completed; extension Unity (Pa.) branch to Jamieson Coal & Coke Company's mine, cost \$177,357, completed; removing 1,000 feet of cover at west end of Radebaugh (Pa.) tunnel, cost \$518,231, completed; engine house facilities at Blairsville, Pa., cost \$458,335, completed; slag track and fill at Sharpsburg, Pa., cost \$817,434, 95 per cent completed; replacing bridge 17.08 with deckplate girders and concrete slab floors at Parnassus, Pa., cost \$176,088, com-

pleted; branch from Chester to Girard Point, Pa., and connection with main line at Eddystone, cost \$3,535,922, 88 per cent completed; reconstruction of bridge at Pequea, Pa., cost \$234,319, 75 per cent completed; South Chester bridge, locomotive and car facilities at Thurlow, Pa., cost \$708,143, 61 per cent completed; extension to power plant facilities at Juniata shops, Altoona, Pa., cost \$1,354,772, 43 per cent completed; replacing bridge 57.99 at Reading, Pa., cost \$316,796, completed; new engine facilities at Derry, Pa., cost \$257,806, completed; extending tracks in eastbound receiving yard at Pitcairn, Pa., cost \$135,931, completed; replacing bridge 70.62 at Aspinwall, Pa., cost \$121,615, 42 per cent completed, and replacing bridge 11.01 with heavier deck trusses on westbound track at Social Hall, Pa., cost \$283,590, completed; bridge 50.09 renewed with new truss slab floor at Pigeon Creek, Pa., cost \$110,737, 85 per cent completed; concrete molding plant at Morrisville, Pa., cost \$434,380, completed; change of line, grade and second track, Bulls Mill to Eldred, Pa., cost \$430,683, completed; grade revision, Corry, Pa., to Brownell, cost \$283,499, 98 per cent completed; Sullivan Way, undergrade bridge at Trenton, N. J., cost \$154,857, completed; new engine house and shop facilities at Phillipsburg, N. J., cost \$171,851, completed; new yard tracks at Robinvale yard, Metuchen, N. J., cost \$145,324, 70 per cent completed; elimination of Hamburg turnpike grade crossing at Buffalo, N. Y., cost \$184,648, 86 per cent completed; drawbridge over Raccoon creek, Bridgeport, N. J., cost \$177,562, completed; bridge 11.99 at Ogden, N. J., cost \$187,605, 90 per cent completed; new drawbridge at Sea Isle City, N. J., cost \$177,477, to be finished by April, 1920; eliminating grade crossings from Spruce to Everett streets, Camden, N. J., cost \$755,031, completed; new engine facilities at Gardenville, N. J., cost \$1,023,106, completed; engine terminal at Perryville, Md., cost \$642,994, 92 per cent completed; new yard replacing existing one at Edge Moor, Del., cost \$2,558,000, 20 per cent completed; additional facilities and extension to existing facilities at engine house, Wilmington, Del., cost \$1,380,880, 65 per cent completed.

#### Pennsylvania Railroad, Lines West

*First Track:* In Jefferson and Belmont counties, Ohio, 4.08 miles.

*Fourth Track:* Yankee Crossing, Ohio, 3.44 miles.

*Other Important Work Under Construction:* Engine terminal facilities at Conway, Pa., cost \$587,550, completed; engine terminal facilities at Stark (Canton), Ohio, cost \$3,261,000, 77 per cent completed; engine handling facilities at Crestline, Ohio, cost \$1,450,000, completed; improved shop and engine house facilities at Wellsville, Ohio, cost \$703,490, 76 per cent completed; enlarged engine terminal at Cleveland, Ohio, cost \$216,955, completed; change of line at Delaware, Ohio, cost \$1,741,849, 96 per cent completed; construction of car repair yard at Fort Wayne, Ind., cost \$437,966, to be finished by February, 1920.

#### Pere Marquette

*Other Important Work Under Construction:* Engine terminal and yard facilities at New Buffalo, Mich., cost \$550,000, work suspended.

#### Philadelphia & Reading

*Third Track:* Between Trenton Junction and Hopewell, N. J., 8.80 miles; Belle Meade to Manville, N. J., 12.10 miles; at Telford, 1.00 mile.

*Fourth Track:* Belle Meade to Manville, N. J., 12.10 miles; in Philadelphia, Pa., 1.30 miles.

*Other Important Work Under Construction:* Concrete arch bridge over Schuylkill river, Philadelphia, Pa., cost \$915,374, completed; concrete engine house, Tulip street yard, Philadelphia, cost \$255,487, completed; engine facilities, Saucon creek, South Bethlehem, cost \$636,435, completed; auxiliary facilities at South Bethlehem, cost \$626,525, to be completed by February, 1920; east end yard improvements at Rutherford, Pa., cost \$142,921; engine house facilities at Darby Creek, Pa., cost \$358,845, completed; overhead highway bridge and 4 additional tracks, Weston, N. J., to Manville, cost \$267,657, completed; undergrade crossing at Asylum road, Trenton, N. J., completed.

#### Pittsburgh & Lake Erie

*Other Important Work Under Construction:* Enlargement of terminal yard at Hazelton, Ohio, completed; improvements at Groveton, Pa., cost \$590,938, completed; extension of eastbound yard at McKees Rocks, Pa., cost \$394,000, completed; replacing viaduct with embankment at Rankin, Pa., cost \$573,370, 85 per cent completed; classification yard at Port Vue, Pa., cost \$207,328, completed.

#### Pittsburg & Shawmut

*Other Important Work Under Construction:* Tunnel lining at Coulter, Pa., completed.

#### Pittsburgh & West Virginia

*Other Important Work Under Construction:* Fifteen-stall roundhouse at Rook, Pa., cost \$120,000, completed.

#### Pittsburgh, Cincinnati, Chicago & St. Louis

*Other Important Work Under Construction:* Track elevation, Indianapolis, Ind., cost \$966,006, 58 per cent completed; freight house at Indianapolis, Ind., cost \$347,951, completed; new yard, engine house and shop facilities at Jefferson, Ind., cost \$1,228,000, 55 per cent completed; engine terminal at Richmond, Ind., cost \$1,149,412, 60 per cent completed; third and fourth track at Richmond, cost \$1,200,870, 84 per cent completed, and main track work, 85 per cent completed; additional shop facilities at Logansport, Ind., cost \$1,717,630, completed; additional shop buildings at Terre Haute, cost \$625,120, completed; grade reduction, Frankfort, Ind., to Logansport, cost \$630,015, completed; shop improvements at Columbia, Ohio, cost \$2,566,907, completed, and engine terminal, cost \$1,623,898, nearing completion; Seisto river bridge at Columbus, cost \$200,600, 30 per cent completed; improvements to engine house facilities, Columbus, cost \$791,609; yard facilities at Columbus, cost \$1,097,922; improvements to engine house facilities at Bradford, Ohio, cost \$798,817, completed; improved yard facilities at Dennison, Ohio, cost \$1,663,690, 28 per cent completed; engine and shop facilities at Dennison, cost \$475,300, 98 per cent completed; extension New Cumberland branch, Chester, W. Va., to state line, cost \$151,828, 72 per cent completed, and from state line to Phillipsburg,

Pa., cost \$1,405,041, 60 per cent completed, track work deferred on both sections; engine terminal facilities at Scully, Pa., cost \$1,643,890, 41 per cent completed.

#### **Pittsburg, Shawmut & Northern**

*First Track:* Force, Pa., to Tyler, 2.89 miles.

#### **Public Belt Railroad of New Orleans**

*First Track:* At New Orleans, La., 0.39 miles.

#### **Red River Lumber Company**

*First Track:* In California, not specified, 10 miles.

#### **Roanoke Railway**

*First Track:* From North Carolina-Virginia state line to Gholsonville, Va., 10 miles.

#### **Sioux City Terminal Railroad**

*First Track:* In Sioux City, Ia., 0.75 miles.

#### **Southern Pacific**

*First Track:* Calipatria-Westmoreland to near Hoytville, Cal., 12.60 miles; between Harrington, Cal., and Hamilton, 46.69 miles; Mill City, Nev., branch extension, 2.26 miles.

*Second Track:* Between Stockham and Polvo, Ariz., 3.13 miles.

*Other Important Work Under Construction:* Dredging San Antonio estuary, West Alameda, Cal., cost \$145,601, completed; new wharf facilities, Oakland Pier, Cal., cost \$437,300, completed; concrete existing enlarged section of tunnel No. 25, Tunnel, Cal., cost \$187,263, 70 per cent completed.

#### **Southern Railroad**

*Second Track:* Between Charlotte, N. C. and South Carolina state line, 4.1 miles; between North Carolina state line and Blacksburg, S. C., 5.72 miles; between Gaffney, S. C., and Cowpens, 12.97 miles; between Cowpens, S. C., and Mount Zion, 7.75 miles; through Greer, S. C., to south of Greenville, 29.91 miles; between Central, S. C., and Tugalo river, 30.00 miles; between Tugalo river and Cornelia, Ga., 13.64 miles.

*Other Important Work Under Construction:* New drawbridge over Congaree river, cost \$117,000, completed; new bridge over Yadkin river, cost \$170,000, completed; Twenty-first street viaduct at Birmingham, Ala., cost \$119,705, completed.

#### **Tennessee Railroad**

*First Track:* Indian Fork, Tenn., to Fort Mountain, 1.50 miles.

#### **Texas & Pacific**

*Other Important Work Under Construction:* Engine terminal facilities at Texarkana, Texas, cost \$110,000, completed; improvements to second track, Whitesboro to Fort Worth, Texas, cost \$1,367,900, 50 per cent completed.

#### **Toledo & Ohio Central**

*Other Important Work Under Construction:* Shortening, enlarging and lining tunnel at Moxalala, Ohio, cost \$120,000, completed.

#### **Union Pacific**

*First Track:* Winton branch in Wyoming, 4.38 miles.

*Second Track:* Buford, Wyo., to Hermosa, 11.11 miles; Pine Bluffs, Wyo., to Archer, 33.35 miles; Wahsatch, Utah, to Emory, 15.82 miles; Manhattan, Kan., to Junction City, 20.50 miles.

*Other Important Work Under Construction:* James street viaduct at Kansas City, Kan., Union Pacific share, \$151,697, completed; engine terminals completed as follows: Green River, Wyo., cost \$997,996; Council Bluffs, Iowa, cost \$1,688,500, and at Junction City, Iowa, cost \$1,220,024. Coal and ash handling facilities at Sidney, Neb., cost \$194,050, completed; machine shop extension at Omaha, Neb., cost \$546,571, completed; new machine shop at Cheyenne, Wyo., cost \$1,713,463, completed.

#### **United Verde & Pacific**

*First Track:* Hopewell tunnel, Ariz., to Jeroma, 3.96 miles.

#### **Verde Valley**

*First Track:* In Arizona, not specified, 0.31 miles.

#### **Vredenburg Saw Mill Company's Railroad**

*First Track:* In Alabama, not specified, 8.00 miles.

#### **West Jersey & Seashore**

*First Track:* In New Jersey on Seabrook branch, 2.00 miles.

#### **Whitney Company's Railroad**

*First Track:* Tilamook Bay, Ore., to Kilches river basin, 12.90 miles.

#### **Willacoochee & Du Pont**

*First Track:* Willacoochee, Ga., to Shaw's Still, 10.00 miles.

#### **Winchester & Western**

*First Track:* Between Winchester, Va., and Wardensville, W. Va., 0.40 miles.

### **Railroad Construction in Canada in 1919**

#### **Alberta & Great Waterways**

*First Track:* In Alberta, mile 275.4 to 283.5, 8.1 miles.

#### **Canadian National**

*First Track:* Oliver branch, Alberta, between mile 44 and mile 100, 44.38 miles; Peace River Junction, Alberta, to White Court, 0.78 miles; Peace River, Alberta, from mile 33.80 to mile 38.10, 4.30 miles; Hanna, Alberta, from mile 2.17 southeast to mile 50.25, 48.08 miles; Luck Lake branch, Sask., to mile 19.75, 19.75 miles; on Melfort-Humbolt branch, Sask., 0.35 miles; Swift Current branch, Sask., from mile 84.43 to mile 97.39, 12.96 miles; Thunderhill branch, Manitoba, from mile 72.90 to mile 90.35, 17.45 miles.

*Second Track:* On Munson branch, Alberta, 6.75 miles.

#### **Grand Trunk Pacific**

*Other Important Work Under Construction:* Diversion at Firdale, Manitoba, miles 92 to 94, replacing temporary trestles with permanent openings and roadway, cost \$420,000, 67 per cent completed.

#### **Kettle Valley**

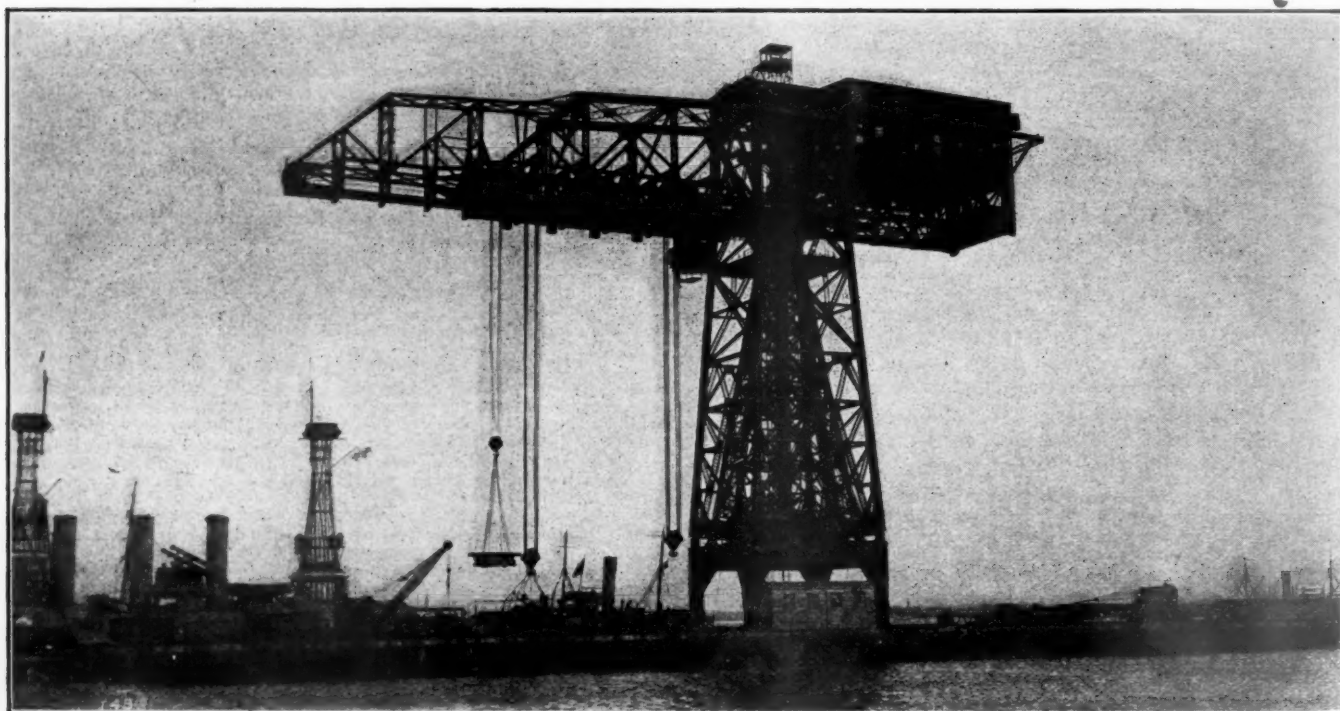
*First Track:* In British Columbia, 5.75 miles.

#### **Pacific Great Eastern**

*First Track:* Clinton, B. C., to Williams Lake, 113.00 miles.

#### **St. John & Quebec**

*First Track:* Westfield Beach to Frederickton, N. B., 70.00 miles.  
*Second Track:* Between Gagetown, N. B., and Westfield, 2.40 miles.



350-Ton Crane at the League Island Navy Yard—the Largest Crane in the World



# Railway Lines Abandoned During the Year 1919

Operation Discontinued on Approximately as Much Mileage  
in the United States as Was Built

**D**URING 1919, 637 miles of main line railway was abandoned for operation in the United States. In addition, 61 miles of line abandoned in 1918, but reported too late for inclusion in that year's record, is included in the appended tabulation showing the names of the abandoned lines and their geographical distribution. Thus a total of 689 miles of line abandoned is shown in the 1919 record. This exceeds by three miles the mileage of new lines built during the year. Furthermore, 1919 is the third year in succession in which our reports have shown the mileage abandoned to have exceeded the mileage of new lines built. During the three years from 1917 to 1919, inclusive, operation was abandoned on 3,319 miles of line and in the same period only 2,386 miles of extensions, branches, and other new lines were completed and placed in service. Thus, during this period there has been an actual decrease of 933 miles in the mileage of railways in the United States.

These figures are borne out by a tabulation in the Interstate Commerce Commission's "Statistics of Railways in the United States for the Year Ending December 31, 1917," which shows the mileage of railways other than of switching and terminal companies, for the four preceding years as follows:

Year	Total mileage owned (Single track). Miles	Eastern District. Miles	Southern District. Miles	Western District. Miles
Dec. 31, 1917.....	253,626.13	61,120.98	51,405.65	141,009.50
Dec. 31, 1916.....	254,045.83	61,141.56	51,572.71	141,331.56
June 30, 1916.....	254,250.62	61,243.19	51,620.39	141,387.04
June 30, 1915.....	253,788.64	61,361.34	51,373.03	141,054.27

It will be noted that there is a decrease in total mileage owned, from June 30, 1915, to December 31, 1917, of 162 miles and from June 30, 1916, of 624 miles. It is interesting to note further that this tendency is shown in all three districts.

Of the total mileage abandoned in 1919, 361 miles have been abandoned permanently and the lines taken up. Operation has been discontinued on 337 miles more and petitions have been made to the state authorities for permission to dismantle many of these lines.

The Georgia Coast & Piedmont is the longest line which was abandoned during the year. This road extended from Brunswick, Ga., on the Atlantic seaboard, inland in a northwesterly direction to Collins. Its sale was confirmed by the United States district court at Savannah, Ga., on October 18, 1918, and it will be dismantled except for a few miles resold to citizens of Reidville, Ga.

The Michigan East & West, 72 miles long, between Manistee, Mich., and Marion, is the second largest line to be abandoned during the year. Operation on this line was discontinued on May 28, 1918.

With a few exceptions, notably the Sidell & Olney, parts of which are still in operation under the corporate names of



the "Kansas & Sidell Railroad" and "Westfield Motor Railway Company," the abandonments this year have embraced the entire mileage of the roads listed in the tabulation. This is in marked contrast to the statistics of 1918 when nearly 225 miles of line was abandoned temporarily through consolidation under government control as a result of the policy of the Railroad Administration to co-ordinate the facilities of parallel lines in many instances. In other words, the abandonments of 1919 are in the main traceable to the inability of roads serving sparsely settled territories with their consequent light traffic to operate without loss at the rates they are permitted to charge in the present period of high costs of labor and materials. It is interesting to note in this connection that on one road the operating ratio rose to 236 per cent before application was made to the commission in its state for permission to discontinue operation.

Another interesting fact is evident from a study of the geographical distribution of the abandoned lines. That is that 10 roads operating in the South Atlantic states abandoned 255 miles of line in a territory embracing several poorly developed agricultural states, while in the New England district only 28 miles of line was abandoned.

The comparison drawn at the beginning of this article between the new mileage of railway line built in the past three years and the mileage of line abandoned during the same period, which shows a net decrease of more than 900 miles of line in operation January 1, 1920, does not mean that the country is overbuilt with railways. On the contrary, many localities embracing large areas are suffering today from the lack of transportation facilities.

In considering the abandonments of 1919, the statistics of the two previous years should be borne in mind as well as the fact that during this period the prices of railway supplies, particularly steel, have been maintained at such high levels that selling lines for junk was often a profitable venture. Starting with 1917, as the high water mark, when 1,338 miles of line was abandoned, the mileage abandoned

## THE AMOUNT OF LINES abandoned during 1919 was approximately equal to that built.

Operation has been discontinued on nearly 1,000 more miles of line than have been built during the last three years.

Almost all of the mileage abandoned last year is on roads on which operation has been discontinued entirely.

A large part of the mileage abandoned in 1919 was in Southern states, which are still lacking in railway facilities.

per year has decreased, although the decrease was not particularly marked in 1918 when 1,283 miles of line was abandoned. However, it should be borne in mind that of this total, 225 miles were abandoned through consolidations under federal control, a large part of which will, without doubt, be returned to operation, on the return of the roads to private control. In 1919, however, the drop in mileage abandoned was marked, being less than 700 miles. These figures at least present the thought that the country may be approaching the end of extreme railway abandonment.

United States	Lines abandoned permanently and taken up. Miles	Lines abandoned and not taken up. Miles
ARKANSAS & GULF— Kimball, Ark., to Laark, La.....	.....	7.00
ARTESIAN BELT— Kirk, Tex., to Macdona.....	.....	3.10
BEAVER, PENROSE & NORTHERN— Beaver, Colo., to Penrose.....	6.49	.....
BIRMINGHAM & ATLANTIC— Pell City, Ala., to Tallageda.....	23.50	.....
CENTRAL RAILWAY OF ARKANSAS— Brigg, Ark., to Fonda Jct.....	2.00	.....
CLARENDON & PITTSFORD— Rutland, Vt., to Hollister.....	.....	19.00
CRYSTAL RIVER— Carbondale, Colo., to Placita.....	.....	20.60
FORT SMITH, POTEAU & WESTERN— Poteau, Okla., to Witteville.....	.....	3.00
GEORGIA COAST & PIEDMONT— Brunswick, Ga., to Collins.....	98.40	.....
INTERSTATE RAILROAD— Stonega, Va., to end of line.....	0.57	.....
KANSAS CITY & MEMPHIS— Rogers, Ark., to Fayetteville, Siloam Springs and Monte Ne.....	59.00	.....
KEWEEAU CENTRAL— Phoenix, Mich., to Mandan.....	13.00	.....
Lac La Belle, Mich., to Lac La Belle Jct.....	7.00	.....
LAUREL RAILWAY— Damascus, Va., to Mountain City.....	.....	16.00
MICHIGAN EAST & WEST— Manistee, Mich., to Marion.....	.....	71.90
NEAME, CARSON & SOUTHERN— Carson Mill, La., to Pujo.....	.....	7.46
PACIFIC & EASTERN— Butte Falls, Ore., to Medford.....	.....	33.00
PRAIRIE FARM & SOUTHWESTERN— Prairie Farm, Wis., to Emerald.....	30.00	.....
ST. JOSEPH VALLEY— Elkhart, Ind., to Columbia.....	.....	70.00
SIDELL & OLNEY— Yale, Ill., to Olney.....	27.60	.....
TEMPLE, NORTHWESTERN & GULF— Temple, Tex., to Messar.....	.....	3.30
TEXAS, ARKANSAS & LOUISIANA— Atlanta, Tex., to Bloomsburg.....	.....	8.00
TIMPSON & HENDERSON— Timpson, Tex., to Henderson.....	.....	34.00
UNICOI RAILWAY— Unicoi Jct., Tenn., to Davisville.....	8.00	.....
WATAUGA & YADKIN RIVER— North Wilkesboro, N. C., to Darby.....	.....	27.00
Elkville, N. C., to Grandin.....	.....	2.00
WAYCROSS & WESTERN— Milltown, Ga., to Cogdell.....	24.00	.....
WILLACOCHEE & DU PONT— Willacoochee, Ga., to Lox.....	.....	12.00
	299.56	337.36
Canada	Miles	Miles
VICTORIA & SIDNEY— Victoria, B. C., to Sidney.....	16.00	.....

Lines Abandoned in 1918, But Received Too Late for Inclusion in the Report for That Year

United States	Lines abandoned permanently and taken up. Miles	Lines abandoned and not taken up. Miles
EAST GEORGIA RAILWAY— Register, Ga., to Glennville.....	39.00	.....
NANTUCKET RAILROAD— Nantucket, Mass., to Siasconsett.....	9.10	.....
ST. LOUIS & MISSOURI SOUTHERN— New Madrid, Mo., to Marston.....	8.00	.....
SAVANNAH, HINESVILLE & WESTERN— Hinesville, Ga., to McIntosh.....	5.00	.....
	61.10	.....

## Packers to Dispose of Refrigerator Lines

THE "BIG FIVE" Chicago packers, in an agreement made between them and the government, at the request of Attorney General Palmer, will divest themselves within two years of all holdings in terminal railroads, in refrigerator car lines and in corporations packing and distributing figs, fruits, vegetables, preserves, beverages, syrups and all other articles unrelated to the meat industry. The packers will in the same term of years dispose of all holdings in the Chicago stockyards. In explaining the reason for divorcing stockyards, terminal railroads and refrigerator car lines from the control of the packers, Mr. Palmer said:

"Control of the stockyards and of other facilities appertaining to the stockyards carries with it, first, a profit derived from the meat industry levied upon it and collected before the animal is slaughtered, all of which profit, however, evidences itself in the ultimate cost which the consuming public must pay for the dressed beef. Secondly, a potential means of favoritism in dealing with commission men. Thirdly, a means to prevent the establishment of new packing plants. Fourth, a means to prevent the development and limit the number of new markets and to centralize and restrict business to the stockyards so controlled, and, fifthly, the peculiar and exclusive access to information concerning the receipts and sales of livestock.

"The principal agent in stifling competition in the unrelated lines was the distributing system of the great packers," said Mr. Palmer, "and for the cure and prevention of these evils the defendants are enjoined perpetually from owning any capital stock or other interests in any corporation which is in the business in the United States of manufacturing, jobbing, selling, transporting, distributing or otherwise dealing in articles other than those directly connected with the meat business. The decree further enjoins the defendants from individually or jointly owning 50 per cent or more of the voting stock in any such corporation."

The agreement provides that immediately upon the entry of the decree of defendants shall commence to dispose of such unrelated commodities owned or handled by them, and shall commence to divest themselves of all their interests in firms, corporations and associations dealing in any of the so-called "unrelated commodities." Among the private car companies owned by the packers are the following: The Armour Car Lines, including the Armour Refrigerator Line, Armour & Co., the Armour Train Line, and the National Woodenware Company, totaling 5,558 cars; the Cudahy, Milwaukee Refrigerator Lines owning 240 cars, the Cudahy Milwaukee Tank Line owning 4 cars and the Cudahy Refrigerator Lines, the Cudahy Provision Refrigerator Line and the Cudahy Oil Tank Line, owning 1,431 cars; Morris & Co. Refrigerator Line and Morris & Co. Tank Lines, owning 2,738 cars; the Swift Refrigerator Transportation Company, including the Swift Livestock Transportation Company, Swift's Livestock Express, Swift's Refrigerator Line, owning 4,999 cars; and the Wilson Car Lines, owning 2,300 cars. The extent of the holdings of the packers in the terminal railways at Chicago cannot be determined, since attorneys for the packers are not prepared to make public any interpretation of the orders relative to the abandonment or retention of the refrigerator lines and other lines owned by their clients.

In a statement issued at Chicago following the announcement of the agreement, officers of the affected companies protested that they had broken no law and that the judgment has in no way been forced through proof of commercial guilt. The companies affected are Armour & Co., Morris & Co., Swift & Co., Wilson & Co., and the Cudahy Packing Company, their main subsidiaries and the principal stockholders and managers.



# Field Work in Valuation Practically Ended

Inventory Forces Being Disbanded—Engineering Reports  
Now Completed on 75,000 Miles of Lines



*Along the Line of the Baltimore & Ohio, Potomac River, Cumberland, Md.*

**I**N SPITE OF THE HANDICAPS which have retarded almost all work during the year just closed, the Division of Valuation of the Interstate Commerce Commission has proceeded largely according to schedule in the prosecution of its work of valuing the properties of the carriers. The year has been marked by the completion of a large part of the inventory work by the field parties, followed by the disbanding of most of these forces, and by the completion of engineering reports on about 75,000 miles of lines.

## Field Inventory

### Approaching Completion

Shortly after the inauguration of the valuation work in 1914, C. A. Prouty, director of the Division of Valuation, estimated that if he was allowed 12 railway and track parties in each of the five districts into which the country was divided for valuation purposes, he would be able to complete the field inventory of all of the railways in the United States as of the average date of January 1, 1920. Since that time the European war has intervened and other influences have arisen to affect the progress of this work adversely. The field work was particularly handicapped during the war by the loss of a large number of experienced employees whom it was necessary to replace by inexperienced and in many cases less efficient men. This condition has continued during the past year in spite of the fact that hostilities have been concluded, and has interfered seriously with the progress of the work. However, in spite of these unusual and unexpected handicaps the date originally set has seen this portion of the work practically completed according to schedule.

In brief, the present status of the work of the field forces in the inventorying of properties in the various districts is

as follows: The field work in the Southern district has all been completed. In the Western district the roadway and track parties have completed their inventories, while the parties engaged in "branch" work (inventorying buildings, bridges and equipment) will continue for several months. In the Pacific district the roadway and track and the structural parties have completed their work and been disbanded, while

the mechanical parties will continue well into the middle of next year. In the Central district it is expected that the roadway and track parties will complete their work in January, while the branch work will be finished about April 1. In the Eastern district about six of the twelve parties are now being disbanded owing to a lack of winter work and the rest of the roadway and track work will be completed with the remaining parties next summer at which time the branch work in this district will also be finished.

## Land and Accounting

### Sections Delayed

The field progress of the Land Section has not kept pace fully with that of the Engineering Section but since the time required in the office between the completion

of the field work and the preparation of the report is considerably less in the Land Section than the Engineering Section, it is expected that the land reports will be filed as promptly as the engineering reports unless delay is encountered because of the failure of the carriers to furnish certain information at the time desired.

The most serious delay has been encountered in the Accounting Section, where it has been impossible to secure and retain an adequate force of accountants sufficiently experienced to complete and assemble the data into the reports.

**W**ORK of field forces practically completed and parties now being disbanded.

Engineering reports on 75,000 miles of lines now completed; expect to finish engineering reports on all roads by December 31, 1921.

Fifty-five reports served on roads to date and 50 more completed tentatively.

Too early to draw final conclusions, but total cost of reproduction exceeds carriers' book investment in all but nine of the first 52 valuations served.

Difficulty is primarily in the office, the field accounting work being well up to schedule.

In a recent letter addressed to the Valuation Committee of the National Association of Railway and Utilities Commissioners, Director Prouty expressed his belief that it would require about two years after the completion of the field work to prepare engineering reports upon all of the principal roads of the country. In other words, he expressed the hope that the Division of Valuation would have ready for the Interstate Commerce Commission engineering, land and accounting reports upon all the principal carriers of the country by December 31, 1921, when the Commission would then be in a position to fix the tentative valuations on these properties.

### Many Engineering Reports Completed

After the completion of its preliminary engineering report on the property of any carrier, it is the practice of the Division of Valuation to submit it to the carrier informally to enable it to present any information which may cause the

Previous to December 31, 1918, engineering reports had been completed on about 25,000 miles of road, while reports were completed on about 50,000 miles additional this year. Director Prouty stated recently that he expects to receive similar reports on 75,000 miles of lines in 1920 and on the remainder in 1921.

Up to the present time valuations have been published by the Interstate Commerce Commission and served on three roads, the Texas Midland, the Winston-Salem Southbound and the Kansas City Southern, while it is expected that a report on the Atlanta, Birmingham & Atlantic will be published and served on the carrier in the very near future. The Division of Valuation has served tentative valuations on 55 properties up to the present time, including the four mentioned above, the larger roads in this group being the San Pedro, Los Angeles & Salt Lake; the New Orleans, Texas & Mexico; the Elgin, Joliet & Eastern and the Chicago, Terre Haute & Southeastern.

In addition, preliminary engineering reports have been

Road	Miles of Road Owned	Cost of Reproduction, New	Cost of Reproduction, Less Depreciation	Total Cost of Reproduction New of Common Carrier Property Owned Other Than Land, including carrier's and Equipment jointly owned property other than land, if any; present value of carrier and non-carrier lands; property held for purposes other than those of a common carrier, and materials and supplies	Investment in Road and Equipment as Shown by Carrier's Books, as of the Date of Valuation
Atlanta, Birmingham & Atlantic.....	641.	\$24,154,998	\$19,408,810	.....	.....
Texas Midland.....	110.	3,382,004	2,527,417	\$3,827,773	\$2,748,171
New Orleans, Texas & Mexico.....	173.	7,668,975	6,471,984	.....	.....
Kansas City Southern.....	778.	44,194,645	36,495,757	.....	.....
Winston-Salem Southbound.....	90.	5,121,188	4,753,006	6,036,767	5,598,558
Elgin, Joliet & Eastern.....	36,418,605	27,899,986	40,329,575	38,683,120	38,683,120
Wrightsville & Tennville.....	102.82	1,563,556	1,180,617	1,864,775	899,097
Tocole Valley Ry.....	7.27	201,746	164,319	.....	.....
Alabama Central.....	8.75	85,428	68,482	86,567	96,000
St. Johns & Ophir.....	8.56	127,414	110,103	130,207	139,161
Missouri Southern.....	65.90	920,912	770,945	955,464	802,484
Ray & Gila Valley.....	11.007	582,414	503,489	.....	.....
Quincy Western (leased).....	6.257	71,206	47,415	72,599	79,817
Tonopah & Tidewater.....	183.95	3,038,896	2,439,145	.....	.....
Bowden Ry.....	13.278	118,874	95,043	.....	.....
Georgia Southern & Florida.....	497.061	10,297,657	7,690,371	12,166,751	12,273,374
The Georgia Northern.....	76.924	851,275	665,891	1,036,376	912,145
Death Valley.....	23.070	359,726	346,257	364,137	365,962
Dover & Southbound.....	26.354	230,857	160,551	235,257	79,776
Carolina R. R.....	14.068	192,057	153,462	187,138	90,600
Hampton & Branchville R. R. & Lumber Co.....	26.247	227,822	163,457	262,621	138,275
Arizona Southern.....	23.567	429,717	313,526	.....	.....
The New Mexico Midland.....	13.611	172,321	127,983	172,903	150,000
Sylvania Central.....	16.431	142,508	109,191	176,794	75,000
San Pedro, Los Angeles & Salt Lake.....	988.519	43,127,960	35,701,567	.....	.....
Louisville & Wadley.....	10.172	159,427	126,970	171,238	106,053
Albany Passenger Terminal Co.....	.....	101,272	95,057	151,669	104,184
Macon & Birmingham.....	96.998	1,828,873	1,437,961	1,963,236	1,006,230
Mississippi Eastern.....	16.610	262,350	189,790	301,788	173,476
Norfolk Southern System.....	902.186	24,067,274	19,799,999	.....	.....
Tampa & Jacksonville.....	54.735	575,274	444,800	.....	.....
Greene County.....	18.828	151,591	119,499	176,498	131,600
Rome & Northern.....	17.645	316,994	261,835	305,985	317,155
Carolina & Yadkin River.....	34.281	671,800	602,299	.....	.....
Flint River & Northeastern.....	23.236	239,547	191,792	284,430	235,925
Kinston-Carolina Railroad & Lumber Co.....	19.806	219,012	145,423	170,150	36,067
Central Railway of Arkansas.....	13.128	213,276	182,582	216,361	251,062
Alabama Northern.....	7.156	104,053	79,004	.....	.....
Wadley Southern.....	88.750	1,029,871	769,314	.....	.....
Chicago, Terre Haute & Southeastern.....	362.280	22,247,890	17,561,158	24,194,049	24,927,762
Hawkinsville & Florida Southern.....	93.005	1,144,728	864,766	1,312,740	703,529
Mississippi River & Bonne Terre.....	63.910	3,957,247	3,144,093	4,079,640	3,597,098
St. Francois County R. R.....	9.878	226,301	162,633	.....	.....
Cimarron & Northwestern.....	21.333	297,528	206,622	299,030	269,431
Joplin Union Depot.....	7.740	433,208	406,363	555,430	553,527
Talbotton Railroad.....	6.797	80,791	64,110	85,593	66,930
Northern Dakota Railway.....	21.188	214,390	156,932	223,904	215,870
Savannah & Northwestern.....	110.839	1,776,219	1,492,616	.....	.....
Santa Fe, Raton & Eastern.....	9.307	272,853	203,859	.....	.....
Evansville & Indianapolis.....	134.800	2,531,238	2,004,856	.....	.....
Farmers' Grain & Shipping Co.....	53.206	830,511	635,527	674,910	650,335
Brandon, Devils Lake & Southern.....	13.052	195,054	150,731	204,956	184,586
Fernwood & Gulf.....	32.401	661,141	522,752	679,291	605,855
Cape Girardeau, Northern.....	105.431	1,338,642	1,083,659	.....	.....
The Potomac, Fredericksburg & Piedmont.....	38.062	642,538	499,051	.....	.....

division to revise the report, in this way correcting inaccuracies and reducing the number of points in controversy to the minimum. After revision, the report is then submitted to the carrier formally and opportunity is offered it to file formal protests. After passing on these protests, the report is delivered to the Commission by the Division of Valuation, after which time all hearings are before the Interstate Commerce Commission itself.

completed on the properties of about 50 other lines and have been submitted informally to the carriers. Among these reports are those on a number of the larger roads including the Great Northern, the Big Four, the Chicago, Rock Island & Pacific and the Boston & Maine.

Since these tentative figures are now being given out by the Division of Valuation at frequent intervals and as others including those on a number of the larger properties will ap-



pear during the next few months, it is natural that much interest should be shown in the relation between these figures (incorrectly termed valuations) and the capitalizations of the roads. It is also highly important that such comparisons be made accurately and with a complete knowledge of the facts.

#### Comparisons Between Valuations and Capitalization

Already considerable inaccurate and misleading information is being disseminated. Typical of the misrepresentations being made is a statement of Representative Huddleston, which appeared in a recent issue of the Congressional Record in the debate of the Esch bill in which he stated that on the first 52 roads on which the Division of Valuation had made engineering reports, there existed a difference of \$207,894,145, or 40 per cent, between the tentative figures of the Division of Valuation for cost of reproduction new and the investment account of the roads, which difference he characterized as water. As showing the possible intent of this comparison it may be noted that the Western Pacific is included in the list of roads presented, although no tentative report has yet been served on that road and the investment figure used, \$156,318,136, was reduced to \$92,085,260 on the reorganization of this company in July, 1916. A similar discrepancy appears in the statement with reference to the Atlanta, Birmingham & Atlantic, the investment account of which is listed at \$53,325,752, although this company's capitalization was reduced to \$39,255,787 at the time of its reorganization on December 31, 1915. These two inaccuracies account for over one-third of the so-called water in the capitalization of the 52 roads listed.

However, aside from such mis-statements there are other inaccuracies which may readily creep into these comparisons. Care must be taken to insure that the valuation and capitalization figures are for exactly the same properties, a problem of no mean proportions in some instances where the intercorporate relationships are more or less involved. This leads one to exclude ownership of all stocks or bonds in other companies. More important, the figures given out in the tentative valuations of the Division of Valuation include only the engineering reports on road and equipment, excluding all lands, materials and supplies in stock, cash on hand, etc.

When a comparison is made of the investment in road and equipment with a sum representing the figures contained in the Commission's reports by adding together the cost of reproduction including jointly owned property, lands, materials and supplies, but not cash on hand and other current assets, it is found that the sum so obtained exceeds the amount shown upon the carrier's books as investment in road and equipment in all of the tentative valuations so far served with the exception of nine of the companies named in Mr. Huddleston's statement.

When it is further recalled that the book cost of investment in road and equipment as shown in the accounts of the carriers is approximately 20 per cent in excess of the actual *net* capitalization of the roads, this comparison is all the more in favor of the railways.

Although no figures have yet been made public by the Division of Valuation as to its preliminary findings on several of the larger roads (the individual mileage of which exceeds the total for 55 roads already reported on), it is understood that they show no great over-capitalization and the preliminary totals for road and equipment alone are greater than the total capitalization of certain properties which have been more or less in the lime light in recent years.

In brief, while it is still too early to draw any general conclusion as to the ultimate result, the indications are that the final figures will not give much comfort to those critics of the railways who were mainly responsible for the enactment of the legislation requiring valuations to be made. The year now opening should see valuation reports completed on

much larger mileage of lines which are more representative of the roads of the country, and will enable more accurate predictions to be made of the ultimate results.

The roads on which tentative valuations have been reported to date are shown in the table. The last two columns show comparisons between the total cost of reproduction new of common carrier property owned other than land, including the carrier's portion of jointly owned property other than land, if any, the present value of carrier and non-carrier lands, property held for purposes other than those of a common carrier, and materials and supplies, as contrasted with the investment in road and equipment as shown on the carrier's books as of the date of valuation for 35 roads.

#### Federal Railroad Company Proposed

A NOVELTY IN RAILROAD OPERATION is provided for in a bill introduced in the Senate on December 15 by Senator Norris of Nebraska, providing for the incorporation of a federal railroad company to purchase and operate the railroads of the United States. The bill provides that this corporation shall be authorized and empowered to lay out, locate, construct, furnish, maintain, operate "*and enjoy*" a railroad or railroads, together with the necessary telegraph and telephone lines and all necessary and useful appurtenances, anywhere within the United States, and that the corporation shall be vested with all the powers, privileges and "*annuities*" necessary to carry into effect the purpose of this act.

The bill does not state, however, the amount of the annuities that would be necessary for the proper enjoyment of such a railroad. The proposed federal railroad company is to have five directors appointed by the President and to hold office during good behavior and to be paid \$12,000 a year each. It would have an authorized capital stock of \$10,000,000,000 of common stock; in addition, an amount of employees' stock, not exceeding one-fourth of the book value of the property, which would be issued to and paid for by employees. The stock would be free from taxation of every kind except federal income and inheritance or state taxes, except that the income from an amount of stock not exceeding \$50,000 would be exempt from all income taxes and any stock held by state, county, municipality and charitable, religious or educational institution not operated for profit would be made exempt from all taxation.

It would be made the duty of the company to acquire all the railroads of the United States as rapidly as it is able to sell stock for the purchase of the same, and to build connecting lines necessary to co-ordinate the railroads which it acquires, with a view to co-ordinating and consolidating all the railroads of the United States under one management in order to reduce transportation to as near cost as is possible, and to eventually retire all railroad bonds and indebtedness of every kind and of the common stock of the corporation. If the full amount of the stock offered by the company is not subscribed from other sources it is provided that the balance shall be subscribed for by the Secretary of the Treasury on behalf of the United States, who would secure the money by issuing government bonds at 4½ per cent. The stock of railroad companies would be purchased by selling stock of the federal company, and any profits that it might make would be used in paying off any bonded indebtedness of the railroads so acquired. The board of directors would have charge of the operation, maintenance and control of all property owned by the corporations and would employ all the officials, managers and employees necessary to operate the railroads, provided that it should not authorize the payment of any salary for any official or any employee in excess of \$12,000 per year.



## Railway Signals and Interlocking on the Decline

Signal Facilities Completed During the Past Year Indicate  
Much Less Than Normal Progress

**A** TOTAL OF 2,071 MILES of road in the United States and Canada was equipped with block signals in 1919 (tables A and D), while 46 roads (table G) built new interlocking plants or made changes in existing ones, a total of 153 plants being built or rebuilt. It is difficult to determine the exact mileage of additional block signals completed during the year; it is also hard to arrive at any definite conclusion as to the number of new interlocking plants of the various types installed during the same period, because a number of the roads failed to include in their reports sufficient information to show whether the facilities completed were additional or replaced older equipment. However, a careful survey of the statistics indicates that at least 489 miles of road equipped with automatic block signals during the year had previously been protected by manual or automatic block. Wherever automatic block signaling was in use previously the changes were due largely to the replacing of one type of signals with another or on account of the protecting of additional tracks.

A comparison of the above figures with similar ones published in the *Railway Age* of January 3, 1919, indicates that 27 miles less road was provided with block signals than was completed during the previous year. Of the 2,071 miles installed in 1919 2,024 miles represent the amount completed during the year on roads in the United States, 144 miles of which consist of manual block. This leaves 1,880 miles of road on which automatic block signals were installed during the year. Comparing this mileage with that reported by the Interstate Commerce Commission, as of January 1, 1919, and which is recorded in the table showing block signals installed in the United States during the 10 years preceding

1919, there appears to have been 85 miles more automatic block signaling installed during 1919 than in 1918.

The progress made during 1919 in adding to and improving signal facilities has suffered from the same influences which have retarded the normal growth and development of

railroad facilities in general. The statistics accompanying this article indicate the status of the situation in-so-far as railway signal improvements are concerned. On the other hand, if one were to judge by the appropriations authorized by the United States Railroad Administration for block signal and interlocking work during 1919, he might be led to believe that the progress made in the construction of signal facilities during the past year was not far below the normal outlay. The expenditures authorized by the United States Railroad Administration, and which represent the estimated value of signal improvements requested by approximately 21 roads, as indicated in the reports of the Administration, amount to about \$7,800,000. This sum, according to the records, covers additional facilities and

the revision of existing facilities requiring extensive changes and renewals brought about on account of laying new rails, ballasting, etc.

It must not be forgotten, in this connection, that a dollar today has less than two-thirds of the purchasing power it had previous to 1916. In other words, the improvements in signaling made during the past twelve months have cost at least 50 per cent more than they would have cost prior to the war. The \$7,800,000 improvements authorized by the Railroad Administration for 1919, if installed prior to the war, would have cost not more than \$5,000,000, an amount considerably below that spent in normal times.

**A**UTOMATIC block signal mileage installed last year was the smallest with one exception, for a period of ten years.

Practically all signal construction has been deferred.

Maintenance programs covering heavy repairs and renewals have been restricted.

The automatic train control has received marked attention on the part of the Railroad Administration.

Due to the present unsettled conditions a majority of roads report incomplete programs for proposed signals and interlocking for 1920.



### The Effect of Government Control

In reviewing railway signaling during the past year a number of questions have arisen relative to the effect government control has had upon the situation. These questions are answered best by summing up the views of those who are in a position to know the conditions existing in this field and by an inspection of the statistics.

1. *Effect upon the installation of signals:* The installation of automatic block signals and interlocking has practically stopped in almost every section of the country. Only

in some instances, the cause may have been due to the adoption of shorter working hours without applying increased forces. On some roads the signal facilities were in good shape during the test period and only required a minimum amount of maintenance, while later demanding heavier maintenance expenditures. As a result some roads have not been able to make the necessary heavy repairs or even to carry on a maintenance program that would enable them to put the signal facilities in the same conditions they were in prior to government control.

3. *Automatic train control:* Early in 1919 the United States Railroad Administration appointed a committee on automatic train control, which has investigated and prepared reports on a number of automatic train stops during the past year, some of which are in service in various parts of the country and were installed for the purpose of test. The tendency seems to be favorable to the use of train control devices as an adjunct to the signal system, and it is believed that within a reasonable time, assuming that the roads are turned back with the enactment of proper legislation, there will be a desire on the part of some of the more congested roads now equipped with automatic block signals to install train control devices for test over considerable distances, possibly to the extent of entire divisions.

4. *Wages and working conditions of the maintenance and supervisory forces:* Reports indicate that both the hourly and monthly basis of pay are in use. On some of the northern roads it has been found advisable to establish the monthly basis of pay in order to avoid overtime, which is necessary practically every day during the summer months in order to carry out the maintenance program. In other sections of the country where the maintenance program for the year can be distributed over a greater period, the necessity for overtime work is practically eliminated, and therefore no hardship results. In such cases the hourly basis of pay may be applied as a general proposition. The maintenance and supervisory forces have received increases in pay varying from 70 to 130 per cent over the 1915 rate, while supervisory officers have received increases varying from 16 to 100 per cent.

### Statistics

The figures so far available, together with the data covering work now under construction and in respect to plants for 1920, are shown in the accompanying tables. The data will be found in the tables under nine heads, as follows:

- A—Automatic Block Signaling Completed in 1919.
- B—Automatic Block Signaling Under Construction.
- C—Automatic Block Signaling Proposed for 1920.
- D—Manual Block Signaling Completed in 1919.
- E—Manual Block Signaling Under Construction (None).
- F—Manual Block Signal Proposed for 1920.
- G—Interlocking Completed in 1919.
- H—Interlocking Under Construction.
- I—Interlocking Proposed for 1920.

### Work on Various Roads

From the reports received the largest mileage of automatic signals installed on a single road was on the Atchison, Topeka & Santa Fe, which placed in service 184 miles of single track and 61 miles of double track, using 389 signals. Other roads installing over 100 miles were the Chicago, Milwaukee & St. Paul, which completed 200 miles of single track signals, using 292 color-light signals on its electrified section, and 12 miles of double track, using 13 semaphore signals; the Chicago, Burlington & Quincy, which completed 53 miles of single track and 129 miles of double track signaling, with a total of 611 signals; the Illinois Central, which installed 134 miles of single track signaling in addition to 52 miles on the Yazoo & Mississippi Valley, the number of signals used on the Illinois Central installation amounting to 239 signals. The Northern Pacific installed 130 miles of single track signaling, with a total of 212 signals, and the Great

### BLOCK SIGNALS INSTALLED IN THE UNITED STATES

During Each Year from January 1, 1907 to January 1, 1919\*

Year	Miles of road		
	Automatic block	Manual block	Total
1909	2,047.1	4,162.2	6,209.3
1910	3,473.8	2,037.3	5,511.1
1911	2,623.4	2,517.2	5,140.6
1912	1,883.9	5,656.2	7,540.1
1913	4,350.5	1,563.4	2,787.1
1914	3,030.7	6,511.5	9,542.2
1915	1,113.1	1,112.0	1.1
1916	1,843.5	196.9	1,646.6
1917	2,242.2	1,214.9	1,027.3
1918	1,794.9	1,398.4	396.5

\*Taken from Interstate Commerce Commission reports.

### NEW BLOCK SIGNALS COMPLETED IN 1919; MILES OF ROAD

	Automatic (Table A)			Manual (Table D)			Both Total miles
	S. T. miles	D. T. miles	Total miles	S. T. miles	D. T. miles	Total miles	
United States	1,208	672	1,880	144	...	144	2,024
Canada	41	6	47	...	...	...	47
Total	1,249	678	1,927	144	...	144	2,071

### NEW BLOCK SIGNALS UNDER CONSTRUCTION, DEC. 31, 1919

	Automatic (Table B)			Manual (Table E)			Both Total miles
	S. T. miles	D. T. miles	Total miles	S. T. miles	D. T. miles	Total miles	
United States	140	128	268	...	...	...	...
Canada	...	2	2	...	...	...	...
Total	140	130	270	...	...	...	...

### NEW BLOCK SIGNALING PROPOSED FOR 1920

	Automatic (Table C)			Manual (Table F)			Both Total miles
	S. T. miles	D. T. miles	Total miles	S. T. miles	D. T. miles	Total miles	
United States	243	99	342	4	...	...	346
Canada	...	17	17	...	...	...	17
Total	243	116	359	4	...	...	363

### INTERLOCKING SIGNALS

	Plants	Number of Levers	
		Mechanical	Electrical
Completed in 1919—			
United States	153	1,906	1,969
Canada	4	75	...
Under construction December 31, 1919—			
United States	46	677	785
Canada	3	8	...
Proposed for 1920—			
United States	36	331	398
Canada	3	39	...
Total, United States	235	2,914	3,152
Total, Canada	10	122	...
Total, United States and Canada	245	3,036	3,152

17 roads report automatic block signaling in course of construction and only 13 report automatic block signals proposed for 1920, while the statistics compiled one year ago showed 36 roads building and a like number reporting proposed work. The signal companies are doing very little work, and some of them have found it necessary to enter other lines of manufacturing in order to keep their plants running.

2. *Restriction of the maintenance program:* Ordinary maintenance has not been disturbed, but heavy repairs and replacements have been restricted. In some instances the roads have been handicapped in maintaining their signals, because it was necessary to keep within the limits of expenditures fixed by the test period. Where such conditions existed

TABLE A—AUTOMATIC BLOCK SIGNALS INSTALLED IN 1919

Name of Road	Miles of Road S.T. D.T.	From	To	No. of signals	Type of Signals	Control System	Remarks
A., T. & S. F.	4	Glorieta, N. M.	Fox Interlocking.	6	Union "S"	.....	Replaces manual block.
	66	Christie, Cal.	Stockton, Cal.	100	Union "S"	3-pos. U. Q. Polarized line	
	118	Larson, Cal.	Fresno, Cal.	214	Union "S"	3-pos. U. B. Polarized line	
A. & W. P.	61	Goffa, Cal.	Bagdad, Cal.	75	Union "S"	3-pos. U. Q. Polarized track	
	32	Newman, Ga.	La Grange	42	Union "S"	.....	
	18	College Park, Ga.	Palmetto	21	Union "S"	A. P. B.	Change from single to double track.
A. C. L.	6	Falling Creek, Va.	James Riv. Bridge	11	Union "S"	Polarized	
Balt. & Ohio	10	Waycross, Ga.	Folston, Ga.	1	Union "S"	Polarized	
	29	Toby, Pa.	Manila	15	Union "T 2"	A.C. normal clear	Three-track line; replacing manual signals, A.C. track and operating circuits.
		Sand Patch	Confluence	41	Union "T 2"	A.C. normal clear	
B. & M.	1	Cummings, Me.	No. Berwick	7	Union "B"	Polarized track	
	1	Salem, Mass.	.....	6	Union "B"	Polarized track	
	3	Ayer, Mass.	Willows	4	Union "B"	Polarized track	
	2	Chelmsford, Mass.	.....	3	Union "B"	Polarized track	
Boston Elevated*†	1	Sullivan Square	Everett	12	3-Color light	A. C. single-trail	
C. N. E.	16	Hopewell Jct., N. Y.	Holmes	34	Union "S"	Polarized, D. C.	Track circuit.
C. R. R. of N. J.	4	North Branch, N. J.	White House	32	Union "S"	Polarized	Replaces manual block.
C. & O.	21	Gordonsville, Va.	Charlottesville, Va.	56	Union "L" light	A. P. B.	Four tracks replace two; revision of signals.
	13	Silver Grove, Ky.	Cincinnati, O.	38	Union "B" 3-pos. U. Q. Line	.....	American train control.
	4	Cotton Hill, W. Va.	Gauley	6	Hall "L" 3-pos. U. Q. A. P. B. traffic lock'g.	.....	Change from 2 to 3 pos., U. Q.
C. & A.	2	Liberty St., Cinc., O.	Brighton	6	Union "B" 3-pos. U. Q. A. P. B.	.....	Single gauntlet.
C., B. & Q.	50	State Prie, Joliet, Ill.	Joliet	2	Motor U. Q.	.....	
	24	Creston, Ia.	Red Oak, Ia.	130	60 deg. L. Q.	Relayed track	
	8	Balfour, Ia.	Balfour, Ia.	60	60 deg. L. Q.	A. P. B.	
	5	Pacific Jct., Ia.	Plattsmouth, Neb.	18	60 deg. L. Q.	Relayed track	
	4	Plattsmouth, Neb.	Oreapolis, Neb.	13	60 deg. L. Q.	A. P. B.	
	15	Oreapolis, Neb.	Gibson, Neb.	41	60 deg. L. Q.	A. P. B.	
	9	Dietz, Wyo.	Ranchester, Wyo.	33	60 deg. L. Q.	A. P. B.	
	60	Zearing, Ill.	Wataga, Ill.	249	60 deg. L. Q.	Double track A. P. B.	
C. M. & St. P.	7	Wataga, Ill.	Galesburg, Ill.	36	60 deg. L. Q.	Relayed track	
	12	Junction Switch	Milbank, S. D.	13	3-pos., U. Q.	A. C.	Three track middle, A. P. B.
	170	Othello, Wash.	Maple Valley	245	Color-light, 3-pos.	A. C.	
	28	Black Riv. Jct., Wash.	Tacoma	47	Color-light, 3-pos.	A. C.	
C. R. I. & P.	6	Topeka, Kan.	Bishop	14	Union "S"	D. C. Polarized line	Electrified section replace semaphore signals.
	9	Paxice, Kan.	McFarland	9	Union "S"	D. C. Polarized line	
	6	Tindall, Mo.	Trenton	12	Union "S"	D. C. Polarized line	Change from single to double track.
		Waukegan, Ill.	.....	1	3-pos., U. Q.	Semi-automatic	
E. J. & E.	18	Lee, Ariz.	Forrest	.....	Union "S"	U. Q. Overlap	
E. P. & S. W.	53	Skykomish, Wash.	Everett	90	Semaphore	.....	
G. N.	24	Wenatchee, Wash.	Leavenworth	48	Semaphore	.....	
	43	Hillyard, Wash.	Newport	85	Semaphore	.....	
	6	Hillyard, Wash.	O. R. & N. Jct.	8	Semaphore	.....	
I. C.	29	Gilman, Ill.	Gibson City	50	Hall "K" 3-pos. U. Q.	Normal clear	Traffic direction.
	71	Springfield, Ill.	Marine	128	Hall "L" 3-pos. U. Q.	Normal clear	Traffic direction.
	12	Vaughn, Miss.	Canton	20	Hall "K" 3-pos. U. Q.	Normal clear	Traffic direction.
	22	Canton, Miss.	Asylum	41	Hall "K" 3-pos. U. Q.	Normal clear	Traffic direction.
Y. & M. V.	9	Tennessee, Miss.	Lake Cormorant	16	Hall "L" 3-pos. U. Q.	Normal clear	Traffic direction.
Interborough R. T.*†	43	Lake Cormorant, Miss.	Coahoma	62	Hall "L" 3-pos. U. Q.	Normal clear	
	3	Utica Ave.	Eastern Parkway	96	Subway light	A. C. track circuit	Two express tracks signaled for 1 min. 30 sec. headway.
	3	Flatbush Ave.	Nostrand Ave.	20	Subway light	Control for local	2 local tracks signaled at curves and interlocking.
	2	Borough Hall	Clark Street	51	Subway light	Relays and with auto-matic stops	Signaled for 1 min. 30 sec. headway.
K. C. C. Co., & St. J.*†	70	Kansas City, Mo.	St. Jo. & Excl. Sp.	100	Light and semaphore	A. C.	Union.
K. C. T.	3	Kansas City, Mo.	Kansas City, Kan.	8	Elec.-pneumatic & A. C.	A. C. track circuits.	
						D. C. sigs. 1 mile...	
						D. C. sigs. 2 miles...	
L. V.	2	Delano, Pa.	Park Place	6	Federal	Line	
	1	Park Place, Pa.	Mahanoy City, Pa.	2	Federal	Line	
	2	Falling Springs, Pa.	Weldon	6	General	Line	
L. & N.	12	Jackson, Ky.	Oakdale	27	3-pos., U. Q.	A. P. B., D. C.	
	10	Montfort, Tenn.	Cumberland River	19	3-pos., U. Q.	Polarized D. C.	No overlap.
	51	Guthrie, Ky.	Mortons	93	3-pos., U. Q.	A. P. B., D. C.	
Missouri Pacific	1	Valley J.	.....	2	.....	.....	Replaced gas sigs.
N. Y. C. (Eastern)	8	Highbridge, N. Y.	Yonkers	21	Hall "T"	D. C., normal danger	
	30	Fonda, N. Y.	Little Falls	46	Hall "L"	D. C., normal danger	Third and fourth tracks.
	7	William St., N. Y.	Black Rock	17	Hall "L"	D. C., normal danger	New.
	16	No. Buffalo, N. Y.	Niagara Falls	35	Hall "L"	D. C., normal danger	Replace L. Q. signals.
C. C. C. & St. L.	20	Middletown, Ohio	Dayton	32	3-pos., D. C., U. Q.	Polarized line	
	11	Bridge Jct., Ill.	Lenox	10	3-pos., D. C., U. Q.	Polarized line	
New York Municipal (Brooklyn R. T.)*†	1	Times Square	59th Street	39	Color-light	A. C.	4-Track.
	1	59th Street	Lexington Ave.	16	Color-light	A. C.	All signals controlled by A. C. track circuits and have automatic stops, and also overlaps.
	4	Marcy Avenue	East N. Y.	50	Color-light	A. C.	4-track.
	2.5	Prospect Park	Avenue H	52	Color-light	A. C.	
	1.5	West End Line	.....	14	Color-light	A. C.	
	1	Culver Line	.....	14	Color-light	A. C.	
N. & W.	5	Clare, Ohio	Idlewild	15	Union "S" 3-pos. U. Q.	Overlap	10-Volt D. C.
N. P.	2	Jamestown, N. D.	Pipestem	9	G. R. S. "2 A"	.....	
	40	Glendive, Mont.	Jerry	76	G. R. S. "2 A"	A. P. B.	
	90	Forayth, Mont.	Huntley	136	G. R. S. "2 A"	A. P. B.	
P. R. R.	5	Gunpowder, Pa.	Bengies, Md.	24	Position-light	A. C.	4-Track
	6	Bengies, Md.	North Point	14	Position-light	A. C.	2-Track
	2	Odonton, Md.	Patuxent	8	Position-light	A. C.	3-Track
	4	Pleasantville, N. J.	Meadows	8	Position-light	A. C.	2-Track
	17	Ancora, N. J.	Egg Harbor	28	Motor, U. Q.	A. C.	2-Track, replace electro-pneumatic signals.
P. M.	40	Fowlerville, Mich.	Grand Ledge	54	Union "S" & "T"	Polarized line overlap	
	19	Waverly, Mich.	Grandville	26	Union "S" & "T"	Polarized line overlap	
	3	Grandville, Mich.	Wyoming	7	Union "S" & "T"	Polarized line	
P. & R.	8	Eastwicks, Phila.	Darby Creek, Pa.	38	Hall Incl. disk, H. & D.	Normal danger	Replaces single track manual telephone block.
	2	Yardley, Pa.	Trenton Jct.	7	Un. top post, A.C., U. Q.	Normal danger	
	2	Trenton Jct.	Ewing Tower	10	Un. top post, A.C., U. Q.	Normal danger	3-Track
	4	Ewing Tower, N. J.	Tower Glenmoore	9	Un. top post, A.C., U. Q.	Normal danger	3 & 4-Track
	11	Tower Glenmoore, N. J.	Belle Mead	52	Un. top post, A.C., U. Q.	Normal danger	Replaces Hall disc 29 sigs., of 78 are semi-automatic.
		Palmyra, Pa.	Hummelstown	3	Hall Inclosed disk	Normal danger	
P. & L. E.	2	Haselton, Ohio	Struthers	3	Un. "B" 2-arm, H. & D.	Polarized track	



TABLE A—AUTOMATIC BLOCK SIGNALS INSTALLED IN 1919—Continued

Name of Road	Miles of Road S.T. D.T.	From	To	No. of signals	Type of Signals	Control System	Remarks
St. L.-S. F.	..	St. Clair, Mo.	..	2	Union "S" 3-pos. U. Q.	Track circuit and line.	Added account of new passing tracks.
..	..	Lebanon, Mo.	..	2	Union "S" 3-pos. U. Q.	Track circuit and line.	
..	..	Marshallfield, Mo.	..	2	Union "S" 3-pos. U. Q.	Track circuit and line.	
Southern	76	Charlotte, N. C.	partanburg, S. C.	96	G. R. S. "2 A"	A. C. Polarized	"Wireless"
..	9	Toccoa, Ga.	N. Switz'd	8	G. R. S. "2 A"	A. C. Polarized	"Wireless"
Southern, Western Lines:							
A. G. S.	7	Toomsaba, Miss.	Russell	12	Union "S" 3-pos. U. Q.	D. C. track	Replaces manual.
..	15	Tannehill, Ala.	Dowdle Jct.	12	Union "S" 3-pos. U. Q.	D. C. track	Replaces single tk. signals.
C. N. O. & T. P.	5	Helenwood, Tenn.	Tunnel Jct.	10	G. R. S. "2 A" 3-pos. U. Q.	D. C. track	Replaces single track automatic signals.
..	2	Mountain Jct.	Lancing, Tenn.	5	G. R. S. "2 A" 3-pos. U. Q.	D. C. track	
..	2	Kings Mountain, Ky.	Fishing Creek	4	G. R. S. "2 A" 3-pos. U. Q.	A. C. track	
..	6	Hanging	So. Fork, Ky.	10	Union Motor	D. C. track	
S. P.	4	Wall Creek, Ore.	White Point	10	Union Motor	Automatic	
..	2	Hilt, Cal.	..	5	Union Motor	Automatic	
..	4	Tucson, Ariz.	Polvo	10	Union Motor	Automatic	Single to double track.
..	8	Walker, Ore.	Goshen	12	Union Motor	Automatic	
..	5	Jean, Ore.	Oswego	11	C. R. S. & S. Co., A.	Automatic	
..	11	Portland division	..	28	Union Motor	Automatic	Extensions of various short signal districts.
G. H. & S. A.	12	El Paso, Tex.	Ysletta	26	Union "B" 2-pos. L. Q.	Polarized track	
H. & T. C.	13	Hempstead, Tex.	Courtney	24	Union "B" 2-pos. L. Q.	Line control	
U. P.	..	Kamela	Hanlon	6	Union "B"	D. C. with pol. track	Replaces single track.
O. W. R. R. & N.	2	Anderson, Ind.	Pit Siding	2	Light	G. R. S.-A. P. B.	
U. T. of Ind.*†	1	Knobmount, W. Va.	Seymour	4	Union "S"	Polarized line	
W. M.	2	..	..	..	..	..	
Total	1,208	672					
Canada							
C. P.	30	Galt, Ont.	Woodstock, N. B.	58	G. R. S. "2 A"	A. P. B.	Protection to station limits.
..	2	Winnipeg Beach	..	1	G. R. S. "2 A"	Neutral track circuit.	
..	3	Whitewold	..	2	G. R. S. "2 A"	Neu. track & line circ.	
..	2	Bradbury	..	1	G. R. S. "2 A"	Neutral track circuit.	
..	2	Engen	..	1	G. R. S. "2 A"	Neutral track circuit.	
..	2	Arfield	..	1	G. R. S. "2 A"	Neutral track circuit.	
T. H. & B.	6	Kinnear, Ont.	Stoney Creek	9	G. R. S. "2 A"	Track and line	Changed A. P. B. to 2 track.
Total	41	6		73			

\*Not under federal control.

†Electric.

Northern installed 120 miles of single track and 6 miles of double track signals.

The largest mileage installation of light signals was that of the Chicago, Milwaukee & St. Paul in the electrified section of its road referred to above, where 292 three-color light type signals were used, while the Pennsylvania Railroad installed 54 miles of two, three and four-track position-light signals, using 44 signals, replacing semaphore-type motor signals. Few other installations of light signals were reported, except on the Interborough Rapid Transit lines in New York City, where 167 subway light signals were in-

stalled during 1919. The Brooklyn Rapid Transit installed 185 color-light signals on approximately 10 miles of single, double and four-track lines during 1919.

In Canada only a small amount of block signal work was completed during the year. The Canadian Pacific reports 30 miles of single track A. P. B. signals installed between Galt, Ont., and Woodstock, N. B., using 58 semaphore signals. This road also reports five separate installations of short block station protection.

Only a few roads report automatic block signals under construction, the greatest mileage reported being at three

TABLE B—AUTOMATIC BLOCK SIGNALS UNDER CONSTRUCTION, DECEMBER 31, 1919

Name of Road	Miles of Road S.T. D.T.	From	To	No. of signals	Type of Signals	Control System	Remarks
A. T. & S. F.	3	Hutchinson, Kan.	..	6	Union "S" and "T"	..	East of interlocking.
C. & O.	9	Russell, Ky.	Greenup, Ky.	19	Union "B" 3-pos. U. Q.	Line	Change from 2 to 3 pos.
Ill Traction*†	17	Stanton, Ill.	Edwardsville, Ill.	30	Semaphore U. Q.	A. C. track circuits.	
Interborough R. T.*†	2	Fordham Road	Gun Hill Road	9	Light	..	3-track—2 local tracks signaled only at curves. Middle not signaled.
..	4	Hunts Point Road	Pelham Bay Park	16	Light	..	
..	7	Chatham Square	129th Street	140	Light	..	Same as above except middle track signaled complete in both directions for 1 min. 30 sec. headway.
L. & N.	13	Maplewood, Tenn.	Brentwood	26	3-pos. U. Q.	A. C. polarized track	Automatic substation with no overlap
N. Y. C. (Eastern)	6	W. Haverstraw, N. Y.	Jones Point	11	Hall "L"	D. C., normal danger	Replace lower quad.
..	2	Tonawanda, N. Y.	..	3	Hall "L"	D. C., normal danger	New (changes of line).
New York Municipal (Brooklyn R. T.)*†	1.5	Lexington Avenue	Queens	25	Color-light	A. C.	G. R. S. Co.
..	2	Rector Street	De Kalb Avenue	32	Color-light	A. C.	G. R. S. Co.
..	2	De Kalb Avenue	Prospect Park	45	Color-light	A. C.	G. R. S. Co.
..	4	Avenue H	Brighton Beach	47	Color-light	A. C.	G. R. S. Co.
N. Y., N. H. & H.	2.5	West End of Harlem	River Branch	..	..	..	6-Track; revision of signals.
N. P.	83	Terry, Mont.	Forsyth	148	G. R. S. "2 A"	A. P. B.	
Pacific Electric*†	1	Los Angeles, Cal.	..	4	2-pos. color-light	A. C., 110-volt.	
Pa. Lines	22	Alliance, Ohio	Massillon	38	Union Motor	Normal clear	New, for f'ght tracks.
..	10	Leetonia, Ohio	Alliance	19	Union Motor	Normal clear	New signaling.
..	5	Clymers, Ind.	Logansport	13	Union Motor	Normal clear	Replace manual block.
P. M.	26	Grand Ledge, Mich.	Elmdale	34	Union Motor	Polarized line overlap.	
..	3	Wyoming, Mich.	Grand Rapids	8	Union Motor	Polarized line	
P. & R.	7	Belle Mead, N. J.	Manville Cross'g.	40	A. C. Mot. Union, U. Q.	Normal danger	Replace Hall disk; 4-track.
..	..	Manville Cross'g.	N. J. Bound Brook	5	A. C. Mot. Union, U. Q.	Normal danger	Replaces Hall disk.
Southern	9	Mountain Jct.	H. F. Tower	15	..	..	
Southern Lines West:							
C. N. O. & T. P.	9	H. F. Tower, Tenn.	Mountain Jct.	15	G. R. S. "2 A" 3-pos. U. Q.	D. C. track	
Virginian	17	Clarks Gap, W. Va.	Mullens	35	Union A. C. 3-pos. U. Q.	Polarized track	
Total	140	128					
Canada							
C. N.	2	Calgary, Alberta	..	4	Union "S"	Track circuit	Signals electric lighted, low voltage battery.
T. H. & B.	..	Hamilton Tunnel	..	2	G. R. S. "2 A"	A. C. track circuits.	2-track—Changing track circuits from D. C. to A. C.
Total	..	..		6			

\*†See footnote at end of Table A.

TABLE C—AUTOMATIC BLOCK SIGNALS—PROPOSED NEW CONSTRUCTION, 1920

Name of Road	Miles of Road S.T. D.T.	From	To	No. of signals	Type of Signals	Control System	Remarks
Balt. & Ohio (East)...	1	Schenley, Pa.	L. Junc.	15	Union "T 2"	Normal clear, d. c...	To replace manual.
	1	Pittsb'g, 33d St.		4	Union "T 2"	Normal clear, d. c...	To replace manual.
B. & O. C. T. ....	35	Willow Grove, Pa.	Goehring	68	Union "T 2"	Normal clear, d. c...	To replace manual.
	0.5	Blue Island, Ill.		1	Electric	Track circuit	Take siding indicator.
	0.5	Harvey, Ill.		1	Electric	Track circuit	
	1	Worth, Ill.		1	Electric	Track circuit	
C. M. & St. P. ....	15	Savanna, Ill.	Green Island, Ia.	16	Semaphore, 3-pos., D. C.		Replacing 2-pos., L. Q.
	2	Milwaukee, Wis.	U.D. Grand Ave.	10	Semaphore, 3-pos., D. C.		Replacing 2-pos., L. Q.
	122	Mobridge, S. D.	Hettinger, N. D.	220	Semaphore, 3-pos., D. C.	Overlaps	
	17	Melstone, Mont.	Sumatra	27	Semaphore, 3-pos., D. C.	Overlaps	
	3	Tacoma, Wash.	Hillsdale	3	Semaphore, 3-pos., D. C.	Overlaps	Signals taken from electrified section.
	2	Forsyth, Mont.		4	Semaphore, 3-pos., D. C.	Overlaps	
	3	Miles City, Mont.		4	Semaphore, 3-pos., D. C.	Overlaps	
	3	Roundup, Mont.		5	Semaphore, 3-pos., D. C.	Overlaps	
Denver & Interurban*†	5	Globeville, Colo.	Westminster	4	A. C.		
E. P. & S. W. ....	12	Winkle, N. M.	Guadalupe			Overlap	
	38	Carrizozo, N. M.	Temporal			Overlap	
Interborough R. T.*†	2	Utica Avenue	New Lots Avenue	9	Light		Signaled at curves and at interlocking only.
New York Municipal							Time control (Federal Signal Co. to install).
Brooklyn R. T.*†	1	Williamsburgh Bridge		20	Color-light	A. C. track and stops.	Replace lock and block.
N. Y. N. H. & H. ....	28	Boston, Mass.	Readville	95	3-pos., U. L. H. Q.	A. C.	Replace telegraph manual.
	7	Danbury, Conn.	Hawleyville	21	3-pos., U. L. H. Q.	A. C.	
Pacific Electric*†	4	Indian Village, Cal.	Sierra Vista	14	3-pos. Color-light	A. C. 110-volts.	
	4	Covina Jct., Cal.	Romona Convent.	12	3-pos. Color-light	A. C. 110-volts.	
Pa. Lines	2	Ashland Ave., Chgo.	Western Av., Chgo.	6	Motor	Normal clear	4-Track, replace manual block.
P. & R. ....	6	Myerstown, Pa.	Lebanon	18	Semaphore A. C. Motor	Normal danger	
U. P. ....	27	Le Roy, Wyo.	Evanston	112	2-Arm L. Q., 2-pos.	H. and D. signals, no overlap	
Total	243			99			
Canada							
C. P. ....	7	Pasqua	Moose Jaw	10		Neutral track and line.	
	3	Percival		3		Neutral track and line.	
	2	Broadview	Station Limits	1		Neutral track and line.	
	3	Austin	Station Limits	1		Neutral track and line.	One track only.
	2	Minnitaki	Station Limits	1		Neutral track and line.	
Total	—			17			

\*†See footnote at end of Table A.

different points on the Pennsylvania Lines, where approximately 40 miles are under way, of which 10 miles is single track and the balance double track.

Of the work proposed for 1920 only one road expects to install more than 100 miles of automatic block. This road is the Chicago, Milwaukee & St. Paul, which plans to install approximately 150 miles of single track signaling, using about 260 three-position upper-quadrant semaphore type signals recovered from the electrified section of its road, due to the installation of light signals in that territory. The reports from the various roads on proposed block signaling are rather incomplete, inasmuch as a large portion of the roads have not prepared programs or submitted budgets for

tion has been reported by the Chicago, Rock Island & Pacific on approximately 25 miles of road between Blue Island, Ill., and Joliet, where the Casale safety device is being used.

### Interlocking

The railroads have installed, enlarged or replaced about as many interlocking plants in 1919 as during the previous year. The total number of plants completed or on which important changes have been made is 147, as compared with 143 during 1918, while there are 46 plants now under construction as compared to 135 plants last year. The proposed new work for 1920, totaling 33 plants, is 48 less than the number proposed a year ago, although the figures given under the column of proposed work are far from complete, as a number of the roads which contemplate additional facilities are not yet prepared to announce their program. During the past three years the Interborough Rapid Transit Company, operating both elevated and subway lines, has made extensive improvements in block and interlocking facilities, and the work done or proposed by this company is conspicuously prominent in all three of the interlocking tables.

The figures in table G are to be taken as an exhibit of the work done rather than as showing the precise amount of the increase of interlocking apparatus in use in the country. A considerable part of the figures represent the reconstruction of old plants or important enlargements to provide for new tracks or the re-arrangement of tracks, rather than the construction of entirely new plants. Also, some duplications necessarily occur, as a joint plant may be reported by two or more roads. The same observations apply to tables H and I.

From the returns received, the largest electric interlocking plant completed during the year is one with 74 working levers, located at Coney Island Creek, on the Brooklyn Rapid Transit. Other roads completing electric interlocking plants with a comparatively large number of working levers are the New York Central, with one plant with 72 levers and another with 44 levers, both located at Rochester, N. Y.; the Chicago, Burlington & Quincy, with 58 levers, Hawthorne, Ill.; the Louisville & Nashville, with 53 levers, at Patio, Ky.; the Pennsylvania, with 46 levers, at Richmond Junc-

TABLE D—MANUAL BLOCK SIGNALING INSTALLED IN 1919

	Miles
Pacific Electric—Covina, Cal., to Lone Hill and La Verne to No. Pomona (single track).....	4
Texas & Pacific—Fort Worth, Tex., to Baird (single track).....	140
Total .....	144

NOTE.—The Pacific Electric installation is operated by electric train staff.

TABLE F—MANUAL BLOCK SIGNALING PROPOSED FOR 1920

Canada	
Canadian Pacific—Saskatoon to Harfield (single track).....	4
Total .....	4

1920 signaling. Only one road in every 14 reports any proposed work.

Table D, covering manual block signaling completed during the year, shows approximately the same additional mileage as was reported last year. Only one road reports over 100 miles of line with this type of protection having been completed during 1919; the Texas & Pacific installed 140 miles between Fort Worth, Tex., and Baird, using 24 station signals, with telephone equipment.

### Automatic Train Control

The use of automatic train control as an adjunct to automatic block signals has been reported as completed during 1919 on the Chesapeake & Ohio between Gordonsville, Va., and Charlottesville, the American Train Control device being the apparatus used. Another installation under construc-



largest installed during the year. Other plants of this type which were installed include the Atlantic Coast Line, Richmond, Va., Terminal, with 40 levers; Boston & Maine, with 56 levers; Boston Elevated, with 42 levers; Interborough Rapid Transit Company, with 114 total working levers; Kansas City Terminal, with 64 total working levers; Philadelphia & Reading, with 98 levers; Philadelphia & Reading, with 43 push buttons (non-interlocking freight yard). Approximately 25 electro-mechanical plants were installed, ranging in size from 6 to 45 working levers, and 63 mechanical plants were installed on various roads, ranging in size from 4 to 91 working levers.

Twenty-two roads report interlocking of various types under construction, the largest machine being 137 levers.

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electric type, on the Brooklyn Rapid Transit at New York. The next largest machine will be a 67 working lever, mechanical type, on the New York Central at South Schenectady, while the third largest machine will be one of the electro-pneumatic type, consisting of 51 levers, on the Pennsylvania, at 60th street, Philadelphia and the next largest consists of a 50-lever electro-mechanical on the Cleveland, Cincinnati, Chicago & St. Louis, at Galion, Ohio.

Only 12 roads report any program for the installation of new interlocking plants or revisions for 1920. The largest installation reported is proposed on the Pennsylvania Lines West at Lectoria, Ohio, consisting of 52 working levers oper-

\*In tables G, H and I a number of electro-mechanical plants (indicated by a star) have been reported without a separation of the electric from the mechanical levers; in which cases the number in the first column includes all of the levers of both kinds. In these three tables the number of plants entered against the name of each road represents the total reported by that road.

ABBREVIATIONS IN TABLES G, H AND I

C.—Crossing.  
D.—Drawbridge.  
E.—Electric ry. crossing.  
E. D. T.—End of double track.  
E. F. T.—End of four track.  
E. T. T.—End of third track.  
J.—Junction.  
M.—Miscellaneous and unclassified.  
S.—Station.  
T.—Terminal.  
X.—Crossovers.  
Y.—Yard.

tion, Ind., and with 40 at Logansport, Ind.; the Pittsburgh & Lake Erie, with 55 levers, at Neville, Pa., and the New York, New Haven & Hartford, 42 levers, at Groton, Conn.

Electro-pneumatic interlocking plants have been installed on eight roads. A 122-lever plant on the Atlantic Coast Line at Myrtle avenue, Jacksonville, Fla., is apparently the

ating in an electric machine. The largest proposed mechanical machine reported will consist of approximately 48 working levers, and will be installed at East Argo, Ill., on the Baltimore & Ohio Chicago Terminal. The largest electro-

TABLE I—NEW INTERLOCKING PROPOSED FOR 1920\*

Road	Plants	Character	No. of working levers	
			Mechanical	Electric
Balt. & Ohio (East).....	4	E.D.T.	52	..
		C	12	..
		J	24	..
B. & O., C. T.....	2	C	20	..
		J	48	..
C. I. & L.....	1	C	20	..
C. M. & St. P.....	2	C	13	..
		D	..	16
Interborough Rapid Transit....	11	..	..	119
N. Y. C. C. & St. L.....	3	J	35	..
		C. J.	30	45*
New York Municipal, Brooklyn Rapid Transit....	1	X	..	8
N. Y. N. H. & H.....	2	Y	..	85
Pa. Lines.....	1	C. X.	..	52
Southern (N.O.&N.E.).....	2	D	..	18
Southern, Lines West:				
C. N. O. & T. P.....	3	J	21	9
		D	..	5
U. P. ....	4	C	16	..
		T	..	41
		E. D. T.	36	..
Total .....	36	....	331	398
Canada				
C. N. Western Lines .....	1	C	13	..
C. P. Lines West .....	2	C	26	..
Total .....	3	....	39	..

\*See note under Table G.

pneumatic plant of which we have been advised will have 59 levers and will be installed on the Interborough Rapid Transit, while the largest electro-mechanical machine will have 35 levers and will be located at Fairfield, Ohio, on the C. C. C. & St. L.

## Corporate Partnership for New York Central Employees

IT HAS BEEN suggested on several occasions recently by students of railway affairs that if railway employees are sincere in their desire to acquire the railway properties of the United States, that there is, under the present system of organization, ample opportunity for them to do so without the assistance of radical plans such as the Plumb plan for government ownership of the railways and their operation by the employees. The fact that the individual employee has an opportunity at present to obtain representation in the management and a share of the profits of railway operation through the existing system of finance, has been recognized by certain employees in offices of the New York Central. The idea of carrying out the plan which is outlined below was conceived by C. F. Mayer, engineer of grade separation of the New York Central at Cleveland, Ohio.

The movement was started in the grade separation department of the New York Central at a meeting called by Mr. Mayer at which he explained the proposition to the employees and left its execution entirely to their judgment. The opportunity was given the men either to purchase stock in the New York Central outright or to acquire it through a ten-payment method somewhat similar to the methods by which Liberty Bonds were purchased during the war. Subscription blanks were passed out at this meeting and the return showed that ten shares would be subscribed for by the 13 men in the office, the three men not subscribing stating specifically that while they did not feel able to subscribe at the present time they were in hearty accord with the project

and wished to be given an early opportunity to subscribe. The action taken in the grade separation department was soon circulated through other departments of the New York Central and as a result eleven additional shares were subscribed for by various employees.

In handling this matter through a bank it is necessary for someone to take the responsibility and Mr. Mayer assumed this for the men to whom he presented the project and who had approved it. The initial payments were received by Mr. Mayer from the subscribers and he made arrangements with a bank, ordered the stocks bought and delivered and attended to the collection of the monthly payments from the men subscribing.

In advocating the extension of this plan to other departments of the New York Central, Mr. Mayer has written a short memorandum on the subject in which he says in part:

"Has it ever occurred to you as an individual that at the present time, as in the past, the opportunity is present for every employee to obtain for himself representation in the management and a share of the profits through the existing system of finance, and some individual effort upon his own part; the direct amount of representation in the management and share in the profits being directly due to his own efforts and the co-operation of all employees of the New York Central System. The natural question is, 'How can this be done?' The answer is, 'By the purchase of New York Central Stock to the limit of individual means,' and, to the statement that the individual has no means wherewith to buy stock, the answer is simple. Through the experience of the past few years it has been demonstrated that it is possible, upon limited salary to set aside each month a certain sum. The possibility of this method of saving has been fully demonstrated through the purchase of Liberty Bonds.

"The method of purchasing Liberty Bonds can well be applied to the purchase of stock, as by paying 20 per cent of the purchase price of the stock, any bank will accept the stock as security, pay the balance, and handle the same as a loan on the basis of monthly installments of 6 per cent. Further many reputable brokers are now selling stock on the 10-payment plan, whereby they require an installment of 20 per cent of the market value of the stock and the balance in 9 equal monthly payments with interest at 6 per cent on the deferred payments.

"To quote figures, on the basis of the present market value which we will take at \$75 to serve as an illustration, the first payment would be \$15 if placed through a broker, plus 1/10 of \$2 or 20 per cent brokerage commission, subsequent to which the following nine payments, each one month apart, would average about \$6.75; upon the payment of the last installment, the stock certificate would be issued in the name of the purchaser. This system, when applied, means that the individual is setting aside regularly a small amount of savings, which in nine cases out of ten he would not do under ordinary circumstances, or in case he did make the saving, the return would not be as great on his investment, due to the fact that the savings account pays normally about 4 per cent. By purchasing stock at \$75, the par value of which is \$100, he is obtaining (on the basis of present New York Central dividends) 5 per cent of \$100 valuation, whereas if he purchases the share at \$75 he nets approximately 7 per cent on his investment.

"Upon the complete payment for his stock, the same is turned over to the individual who thereby becomes a stockholder, and as such, is entitled to a vote in the management of the corporation. Upon receipt of the interest on the stock which he owns, he immediately participates in the profits of the corporation, and has thus obtained, through some effort upon his own part, the principles for which he is striving, in a manner based on equity, reason and the common good."





Consolidation Locomotive Built for Polish Government on Order for 150 Given to Baldwin Locomotive Works.

## Few Railroad Orders for Locomotives in 1919

Foreign Business Totaling Only About 900 Makes Up Three-Quarters of Year's Output

THE NUMBER OF LOCOMOTIVES ordered for service in the United States during 1919—only 214—marks a record in the history of the railroads of the country so low as to be almost impossible of belief. The orders placed by Canadian roads either with American or Canadian builders totaled 58, while orders for export reached a total of 898, a total of all three of but 1,170. In other words, the foreign orders and the domestic together were barely sufficient to bring the total up to the domestic orders alone of the poorest year since 1901, namely, 1908, when only 1,182 locomotives were ordered for domestic service. The 1919 totals quoted above compare with figures for 1918 of 2,593 for domestic service

TABLE I. THE LOCOMOTIVE ORDERS OF 1919

For service in the United States.....	214
For service in Canada.....	58
For export to other countries.....	898
Total .....	1,170

in the United States, 209 for Canadian roads and 2,086 for the American forces in France or for export.

In last year's review of the equipment statistics for 1918 (*Railway Age*, January 3, 1919, page 82), the point was made that nearly all the orders reported were placed by governments—that is, by the United States government as represented by the Railroad Administration or the Director General Military Railways, or by the state-owned railroads of foreign countries. This year the first two have kept out of the market, the one for reasons explained in more detail in other articles in the present issue, the other because of the cessation of the demands of war. The exchange situation and the difficulties of financing have at the same time prevented the state-owned and other roads of foreign countries from buying in the American markets in as great quantity as the demands of transportation in these countries might have made desirable. The gap between the cessation of government orders in this country and the resumption of purchases by the privately controlled railroads explains the extremely low figures for 1919. The total of locomotives ordered for domestic service represents only those locomotives ordered by lumber roads and industrial lines; there are but few orders for railroad service.

It is hardly worth while to sketch the developments of the year in the locomotive market. There have been no developments. It has been an idle year, from the standpoint of domestic business. The locomotive companies, at least as

far as domestic business is concerned, have had to content themselves with looking ahead to the time when the railroads would be returned to private control and until the roads would be in a position to make up the motive power shortage that has resulted from the wear and tear of the biggest business in the railroad's history and from the comparatively small amount of purchases of the past few years.

The *Railway Age* has pointed out a number of times in the past the importance that foreign orders have played in locomotive business. They played a large share in 1916 and 1917 when they exceeded, and 1918 when they approached, the domestic orders. The *Railway Age*, however, did not look forward to a year in which the foreign orders would constitute over 75 per cent of all the orders placed, as was the case in 1919, or particularly to a year in which domestic orders would be so low as to allow the 75 per cent to be attained with a foreign total of only about 900. The foreign orders this year included business from all over the

TABLE II. ORDERS FOR LOCOMOTIVES SINCE 1901

Domestic orders only			
Year	Locomotives	Year	Locomotives
1901.....	4,340	1908.....	1,182
1902.....	4,665	1909.....	3,350
1903.....	3,283	1910.....	3,787
1904.....	2,538	1911.....	2,850
1905.....	6,265	1912.....	4,515
1906.....	5,642	1913.....	3,467
1907.....	3,482	1914.....	1,265
Domestic and Foreign			
Year	Domestic	Foreign	Total
1915.....	1,612	850	2,462
1916.....	2,910	2,983	5,893
1917.....	2,704	3,438	6,142
1918.....	2,802	2,086	4,888

world. The Italian, Belgian and Polish orders of 150 each and the South African order for 70 made up the larger share of the total.

The number of locomotives built in the United States and Canada in 1919, according to the compilations of the *Railway Age*, was 3,272, of which 2,162 were built for domestic use and 1,110 for export. Of the domestic total 2,055 engines are shown as having been built in the United States for use on the railroads in this country and 107 in Canada for use in that country. The totals given are but one-half those of 1918, when 6,475 locomotives were produced in the United States and Canada. It will be noted, however, that the total domestic output of 1919 was considerably above that of the years immediately preceding 1918.

The *Railway Age* is somewhat unfortunate in having been unable to secure as complete figures of production this year as usual. One of the largest builders, the Baldwin Locomotive Works, has declined to give the paper its usual fig-

ures of export production, so that as to export production the

editors have had to content themselves with making an estimate from other information, which it is hoped will be found sufficiently accurate to permit of the proper comparisons. An analysis of the production for the year, as compared with the orders for new equipment placed during the year, plainly shows that there is little hope that the 1920 production of the locomotive plants will rival that of 1917 or 1918. The builders have not now large unfilled orders ahead of them, and in the case of domestic orders there is practically no business left on the books. Of course, the return of the railroads to private control may result in large purchases of motive power. The roads here and the roads abroad as well need locomotives and need them badly.

The lists of orders appended are from official sources. They will, no doubt, suffer from a few omissions of small and less important orders, especially for export, but they will, nevertheless, show what business the locomotive plants have received during 1919. The *Railway Age* this year as last did not send out letters to all the railroads, because it was able to obtain such small amount of data as was necessary as to domestic railroad orders from the Railroad Administration. The usual letters were sent to the builders, and the output figures were obtained directly from them. Lists from the builders, as well as the usual weekly reports in the Equipment and Supplies column of the *Railway Age*, permitted the checking and amplification of the tables in the usual way.

TABLE III—THE LOCOMOTIVES BUILT

	Domestic	United States	Canada	Total
Domestic .....	2,055	109		2,162
Foreign .....				1,110
Total .....				3,272

Comparison with Previous Years					
Year	Domestic	Foreign	Total	Year	Domestic
1896 .....	866	309	1,176	1908*	1,886
1897 .....	865	386	1,251	1909*	2,596
1898 .....	1,321	554	1,875	1910*	4,441
1899 .....	1,951	514	2,475	1911*	3,143
1900 .....	2,648	505	3,153	1912†	4,403
1901 .....			3,384	1913†	4,561
1902 .....			4,070	1914†	1,962
1903 .....			5,152	1915†	1,250
1904 .....			3,441	1916†	2,708
1905*	4,896	595	5,491	1917†	2,585
1906*	6,232	720	6,952	1918†	3,668
1907*	6,564	798	7,362		

\*Includes Canadian output.

†Includes Canadian output and equipment built in railroad shops.

### Locomotives Ordered in 1919

Domestic Orders									
Purchaser	No.	Type	Cylinders	Weight	Super-heater	Brick arch	Valve gear	Mechanical stoker	Builder
Aberdeen & Rockfish R. R.	1	4-6-0	18 x 24	126,500	Yes	No	.....	.....	Baldwin
Apache Ry.	1	2-8-2	20½ x 28	179,000	No	Yes	.....	.....	Baldwin
Aurora, Elgin & Chicago	1	4-0-4	.....	100,000	Electric	freight	.....	.....	Gen. Electric
Bellgrade Lbr. Co.	1	Geared	.....	64,000	.....	.....	.....	.....	Heisler
Black River Lbr. Co.	1	Geared	.....	64,000	.....	.....	.....	.....	Heisler
Brooks-Scanlon Lbr. Co.	1	2-8-2	18 x 24	145,000	Yes	No	.....	.....	Baldwin
Brown Co.	1	Saddle tank	17 x 24	.....	.....	.....	.....	.....	Vulcan
Brown, Geo. C., & Co.	1	Geared	.....	52,000	.....	.....	.....	.....	Heisler
Burton-Swartz Cypress Co. of Fla.	1	2-6-2	16 x 24	114,000	No	No	.....	.....	Baldwin
Caddo River Lumber Co.	1	2-6-2	17 x 24	125,000	No	No	.....	.....	Baldwin
Caddo River Lumber Co.	1	2-6-2	17 x 24	125,600	No	No	.....	.....	Baldwin
Cairo, Truman & Southern	1	Geared	.....	94,000	.....	.....	.....	.....	Heisler
Canal Lumber Co.	1	Geared	.....	106,000	.....	.....	.....	.....	Heisler
Carey, Philip, Mfg. Co.	1	0-4-0	14 x 22	79,000	No	No	.....	.....	Baldwin
Central Warehouse Co.	1	4-0-4	.....	100,000	Electric	switch	.....	.....	Gen. Electric
Chattahoochee Valley	1	0-6-0	20 x 26	133,000	No	Yes	.....	.....	Baldwin
Cherry Valley Timber Co.	1	2-8-2	18 x 24	140,800	No	No	.....	.....	Baldwin
Chicago Mill & Lumber Co.	1	Geared	.....	44,000	.....	.....	.....	.....	Heisler
	1	Geared	.....	64,000	.....	.....	.....	.....	Heisler
Columbia & Nehalem River	1	2-6-2	18 x 24	133,000	No	No	.....	.....	Heisler
Corn Products Refining Co.	1	0-6-0	19 x 24	132,000	No	No	.....	.....	Baldwin
Cowan, L. A.	1	Geared	.....	80,000	.....	.....	.....	.....	Baldwin
Crescent Refractories Co.	1	0-4-0	10 x 16	36,000	No	No	.....	.....	Heisler
Crucible Steel Co. of Am.	1	0-4-0	8 x 14	22,000	No	No	.....	.....	Baldwin
Darby, J. F. Lumber Co.	1	4-6-0	18 x 26	126,500	No	No	.....	.....	Baldwin
Dayton-Goose Creek Ry.	1	2-6-0	19 x 24	122,800	Yes	No	.....	.....	Baldwin
Deep River Lumber Corp.	1	2-6-2	12 x 16	55,000	No	No	.....	.....	Baldwin
Detroit Edison Co.	2	0-6-0	21 x 26	139,000	No	Yes	.....	.....	Baldwin
Donora Southern	1	0-4-0	15 x 22	80,000	No	No	.....	.....	Baldwin
East Tenn. & Western N. C.	1	4-6-0	16 x 22	98,800	No	No	.....	.....	Baldwin
Florida Sawmill Co.	2	2-6-2	15 x 24	92,000	.....	.....	.....	.....	Baldwin
Fore River R. R.	1	0-6-0	19 x 26	121,000	.....	.....	.....	.....	American
Foster Creek Lumber Co.	1	Geared	.....	150,000	.....	.....	.....	.....	Heisler
Frost, Johnson, Lumber Co.	1	2-8-2	18 x 24	143,400	No	No	.....	.....	Baldwin
Gale Lumber Co.	1	2-4-2	10 x 14	40,000	No	No	.....	.....	Baldwin
Gary, W. W.	15	Geared	.....	48,000	.....	.....	.....	.....	Heisler
Giles Bay Lumber Co., Inc.	1	4-6-0	18 x 26	140,000	No	No	.....	.....	Baldwin
Gulf Refining Co.	1	0-6-0	18 x 24	105,000	No	No	.....	.....	Baldwin
Gullege Lumber Co.	1	Geared	.....	80,000	.....	.....	.....	.....	Heisler
Harbeson, W. B., Lumber Co.	2	2-6-2	15 x 24	92,000	No	No	.....	.....	Baldwin
	1	2-6-2	17 x 24	127,800	Yes	No	.....	.....	Baldwin
Humble Oil & Refining Co.	1	0-4-0	11 x 16	43,000	No	No	.....	.....	Baldwin
Ind. Portland Cement Co.	1	0-4-0	8 x 12	22,000	No	No	.....	.....	Baldwin
Industrial Lumber Co.	2	2-6-2	16 x 24	107,800	No	No	.....	.....	Baldwin
Ironton R. R.	1	0-8-0	21 x 28	163,000	No	No	.....	.....	Baldwin
King-Ryder Lumber Co.	1	2-6-2	15 x 20	84,000	No	No	.....	.....	Baldwin
La Belle Iron Works	1	0-4-0	17 x 20	91,000	No	No	.....	.....	Baldwin
Lamb Gary Lumber Co.	1	Geared	.....	48,000	.....	.....	.....	.....	Heisler
Leesville, Slagle & Eastern	2	2-6-2	17 x 24	122,000	No	No	.....	.....	Baldwin
Lodwick Lumber Co.	1	2-6-2	13 x 22	79,000	No	No	.....	.....	Baldwin
La. Ry. & Nav. Co.	2	2-8-0	20 x 26	156,400	Yes	No	.....	.....	Baldwin
Lufkin Land & Lumber Co.	1	2-6-2	15 x 20	89,000	No	No	.....	.....	Baldwin
Madiam Lumber Co.	1	Geared	.....	64,000	.....	.....	.....	.....	Heisler
Meridian Lumber Co., Ltd.	1	2-6-0	17 x 24	101,000	No	No	.....	.....	Baldwin
Midland	3	4-6-0	16 x 24	98,000	No	No	.....	.....	Baldwin
Mowbray & Robinson	1	Geared	.....	106,000	.....	.....	.....	.....	Heisler
Muskegon Ry. & Nav. Co.	1	0-6-0	22 x 26	154,000	No	No	.....	.....	Baldwin
Ozan Graysonia Lumber Co.	1	2-6-2	17 x 24	125,000	No	No	.....	.....	Baldwin
Pacific Electric	2	Electric	1,200 volt	120,000	.....	.....	.....	.....	Baldwin
Pennsylvania R. R.	50	Passenger	.....	.....	.....	.....	.....	.....	Bald. - West'house shops
Petoskey Portland Cement Co.	1	0-4-0	14 x 22	79,000	No	No	.....	.....	Baldwin
Pickens R. R.	1	2-6-0	16 x 24	99,000	No	No	.....	.....	Baldwin
Pittsburgh Plate Glass Co.	1	0-6-0	18 x 24	105,000	No	No	.....	.....	Baldwin
Polleys Lumber Co.	1	Geared	.....	94,000	.....	.....	.....	.....	Heisler
Proctor & Gamble Co.	1	0-6-0	19 x 26	123,000	No	No	.....	.....	Baldwin
Rainey Wood Coke Co.	1	0-4-0	22 x 26	160,000	No	No	.....	.....	Baldwin
Red River & Gulf	1	4-4-0	15 x 24	89,000	Yes	No	.....	.....	Baldwin
Riter Conley Mfg. Co.	1	0-4-0	17 x 24	100,000	No	No	.....	.....	Baldwin
Ryan, Philip A., Lumber Co.	1	2-8-0	16 x 22	102,400	No	No	.....	.....	Baldwin



Purchaser	No.	Type	Cylinders	Weight	Super-heater	Brick arch	Valve gear	Mechanical stoker	Builder
Salt Lake & Utah.....	1	Electric	1,500 volt	100,000	..	..	..	..	Bald. - West'house
Sacramento & Northern.....	2	Electric	600 volt	120,000	..	..	..	..	Bald. - West'house
San Augustine Lumber Co.....	1	2-6-2	18 x 24	125,000	Yes	Yes	..	..	Baldwin
Sand Springs Ry.....	1	Electric	600 volt	100,000	..	..	..	..	Bald. - West'house
Sandy River & Rangeley Lakes.....	1	2-6-2	12 x 16	54,000	No	No	..	..	Baldwin
San Luis Southern Ry.....	1	2-6-0	17 x 24	100,000	No	No	..	..	Baldwin
Savannah & Atlanta.....	3	2-8-2	22 x 28	208,700	Yes	Yes	..	..	Baldwin
Savannah & Southern.....	1	4-6-0	4 x 22	82,000	No	No	..	..	Baldwin
Sewell Valley R. R.....	1	2-8-2	18 x 24	144,000	No	No	..	..	Baldwin
Shevlin-Hixon Co.....	1	2-8-2	20 1/2 x 28	179,000	No	Yes	..	..	Baldwin
Smith-McCue Coal Co.....	1	2-8-2	20 1/2 x 28	175,500	No	No	..	..	Baldwin
Snoqualmie Falls Lumber Co.....	1	0-4-0	20 x 16	12,000	No	No	..	..	Baldwin
Smith, W. T., Lumber Co.....	1	2-8-2	19 x 24	149,000	No	No	..	..	Baldwin
Solvay Process Co.....	1	Geared	..	80,000	..	..	..	..	Heisler
Southern Pine Lumber Co.....	1	Geared	..	72,000	..	..	..	..	Heisler
Standard Oil Co.....	1	Geared	..	72,000	..	..	..	..	Heisler
Standard Oil Co. of La.....	1	2-6-2	16 x 24	107,000	Yes	No	..	..	Baldwin
Standard Oil Co. of N. J.....	1	0-4-0	6 x 10	13,600	No	No	..	..	Baldwin
Steel & Tube Co. of America.....	1	0-6-0	17 x 24	110,500	No	No	..	..	Baldwin
Stimson, J. V., Hardwood Co.....	1	0-6-0	19 x 24	108,000	No	No	..	..	Baldwin
Stimson Veneer & Lumber Co.....	1	0-6-0	19 x 22	123,000	Yes	Yes	..	..	Baldwin
Surry Lumber Co.....	2	0-6-0	18 x 24	101,600	Yes	No	..	..	Baldwin
Tenn. R. R. Ass'n of St. L.....	15	0-6-0	18 x 24	100,000	No	No	..	..	Baldwin
Tionesta Valley Ry.....	1	Geared	..	64,000	..	..	..	..	Heisler
Unadilla Valley.....	2	Geared	..	64,000	..	..	..	..	Heisler
Union R. R.....	5	2-6-2	12 x 18	57,000	No	No	..	..	Baldwin
Union Transportation Co.....	1	2-6-2	22 1/2 x 30	204,000	Yes	..	..	..	American
United Verde Copper Co.....	2	0-6-0	..	80,000	..	..	..	..	Heisler
Verde Tunnel & Smelter Co.....	2	2-6-2	17 x 24	122,000	No	No	..	..	Baldwin
Weed Lumber Co.....	1	2-8-0	25 x 32	262,000	Yes	..	..	..	Baldwin
Weirton Steel Co.....	3	4-4-0	17 x 24	96,000	No	No	..	..	Baldwin
W. Virginia No.....	1	Switching	21 x 26	164,000	..	..	..	..	American
White, A. C.....	1	Switching	21 x 26	164,000	Yes	..	..	..	American
Winston-Dear Co.....	2	Mallet	23 1/2 x 37 x 32	448,000	Yes	..	..	..	American
Wis. & Arkansas Lumber Co.....	1	2-6-2	17 x 24	123,000	No	No	..	..	Baldwin
Wis. Ala. Lumber Co.....	1	0-4-0	16 x 24	100,000	No	No	..	..	American
Wood, R. D. & Co.....	1	0-6-0	22 x 26	160,000	No	No	..	..	American
	1	2-8-0	21 x 24	152,000	No	No	..	..	Baldwin
	1	Geared	..	94,000	..	..	..	..	Heisler
	2	0-6-0	21 x 26	155,700	No	No	..	..	Baldwin
	1	2-6-0	17 x 24	111,000	No	No	..	..	Baldwin
	1	Geared	..	126,000	..	..	..	..	Heisler
	1	Geared	..	150,000	..	..	..	..	Heisler
	1	0-4-0	17 x 24	100,000	..	..	..	..	Baldwin

## Orders from Railways and Other Companies in Canada

Canadian National.....	25	0-6-0	21 x 26	140,000	Yes	Yes	..	..	Canadian
National Ry.....	25	4-6-2	23 1/2 x 28	260,000	Yes	..	..	..	American
Hydro Electric Power Commission.....	7	Electric	600 volt	100,000	..	..	..	..	Can. Car & Fdy.
Oshawa Ry. (Canada).....	1	Electric	600 volt	100,000	..	..	..	..	Bald. - West'house

## Orders from Other Countries

American Trading Co. (Cuba).....	1	*2-8-0	18 x 24	125,000	..	..	..	..	American
	1	2-8-0	14 x 20	72,000	..	..	..	..	American
	1	2-6-2	..	113,000	No	..	..	..	American
Belgian Government.....	75	2-8-0	24 x 28	186,000	Yes	..	..	..	American
	75	2-8-0	..	..	..	..	..	..	Baldwin
Broken Hill Prop. Co. (Australia).....	2	2-8-2	..	..	..	..	..	..	Baldwin
Central of Brazil.....	6	4-6-2	21 1/2 x 28	205,000	Yes	..	..	..	American
	7	2-8-0	21 1/2 x 26	165,600	Yes	..	..	..	American
	5	2-8-0	17 x 20	93,000	Yes	..	..	..	American
Cerro de Pasco (Peru).....	2	2-8-0	21 x 28	164,000	..	..	..	..	American
Cordoba Central (Argentina).....	6	2-8-2	21 1/2 x 24	165,000	Yes	..	..	..	American
	6	2-8-2	21 1/2 x 24	165,000	Yes	..	..	..	American
Cuba R. R.....	1	2-8-2	21 1/2 x 24	165,000	Yes	..	..	..	American
Danish State Rys.....	16	4-6-0	20 x 26	152,000	Yes	..	..	..	American
Dorada Extension Ry (Chile).....	3	2-6-0	460 x 610 mm.	44,630 kgs.	Yes	..	..	..	Baldwin
Egyptian State Rys.....	30	2-6-2	15 x 20	85,000	..	..	..	..	American
	20	2-6-0	..	..	..	..	..	..	Baldwin
	12	4-4-2	..	..	..	..	..	..	Baldwin
Federated Malay States Rys.....	12	..	..	..	..	..	..	..	Baldwin
Hershey Cuban.....	7	4-0-4	Electric freight	120,000	..	Electric freight	..	..	General Electric
Imp. Karafuta Government (Japan).....	4	2-6-2	14 x 22	90,000	..	..	..	..	American
	1	2-6-2	14 x 22	90,000	..	..	..	..	American
	2	2-6-2	14 x 22	90,000	..	..	..	..	American
Imperial Rys of Formosa.....	4	2-8-0	20 x 24	134,000	Yes	..	..	..	American
Italian State Rys.....	150	2-8-0	21 1/2 x 27 1/2	149,600	Yes	..	..	..	American
Jamaica Government Rys.....	3	4-8-0	19 x 26	138,880	Yes	Yes	..	..	Canadian
	3	..	..	..	..	..	..	..	Baldwin
Kaijama Mining Co. (China).....	2	0-6-0	12 x 18	60,000	..	..	..	..	American
	1	Switching	12 x 18	..	..	..	..	..	American
Korean Government.....	12	2-8-2	25 x 28	206,000	Yes	..	..	..	American
Lourenco Marques (Port. Ea. Africa).....	5	2-10-2	..	..	..	..	..	..	Baldwin
	3	4-6-2	..	..	..	..	..	..	Baldwin
Mogyana Ry. (Brazil).....	4	2-6-6-2	16 1/2 & 26 1/2 x 24	160,000	Yes	..	..	..	American
Mora & Mendoza (Cuba).....	1	0-4-0	14 x 22	79,000	..	..	..	..	American
Mysore State Rys. (India).....	5	2-6-4	..	..	..	..	..	..	Baldwin
Nigerian Rys.....	10	4-8-2	18 x 23	133,000	Yes	..	..	..	American
Northern R. R. (France).....	50	2-8-2	..	..	..	..	..	..	Baldwin
Norwegian State Rys.....	2	4-6-0	22.05 x 23.62	128,800	Yes	..	..	..	Baldwin
	6	2-8-0	..	..	..	..	..	..	Baldwin
	7	2-6-2	..	..	..	..	..	..	Baldwin
	3	0-6-0	..	..	..	..	..	..	Baldwin
Pesant Co. (Cuba).....	1	2-6-0	17 x 24	110,000	..	..	..	..	American
Polish Government.....	150	2-8-0	21 x 28	167,300	Yes	..	..	..	Baldwin
Prov. of Santa Fe R. R. (Argentina).....	20	4-6-2	16 x 20	105,000	..	..	..	..	American
Hudson, Robert, Ltd. (for Port. Ea. Africa).....	2	2-6-0	11 x 16	37,000	..	..	..	..	American
Shantung Ry. (China).....	7	2-8-0	21 x 26	160,000	Yes	..	..	..	American
	2	2-8-0	21 x 26	160,000	Yes	..	..	..	American
	1	2-8-0	21 x 26	160,000	Yes	..	..	..	American
Sorocobana Ry. (Brazil).....	8	2-8-2	19 x 20	125,000	Yes	..	..	..	American
South African Government Rys.....	20	4-8-2	22 x 28	200,000	Yes	..	..	..	American
	20	4-8-2	22 x 26	195,000	Yes	..	..	..	American
	30	4-8-2	22 1/2 x 26	205,100	Yes	..	..	..	Baldwin
South Manchurian Ry.....	26	2-10-0	23 x 28	202,000	Yes	..	..	..	American
	12	0-8-0	..	..	..	..	..	..	Baldwin
	6	0-8-0	..	..	..	..	..	..	Baldwin
South Manchurian.....	3	4-0-4	..	112,000	..	Electric freight	..	..	General Electric
Taiwan Rys. (Formosa).....	3	2-8-0	20 x 24	134,000	..	..	..	..	American
Tata Iron & Steel Co. (India).....	8	0-6-0	18 x 24	110,000	..	..	..	..	American
Trinidad Government Rys.....	3	4-6-0	11 x 24	95,000	..	..	..	..	American
	3	Switching	11 x 16	43,000	..	..	..	..	American
United Fruit Co. (for Cuba).....	2	2-8-0	17 x 24	..	..	..	..	..	Baldwin
United Rys of Havana.....	10	2-8-0	20 x 26	160,000	..	..	..	..	American
	1	2-8-0	16 x 20	97,000	..	..	..	..	American
	4	0-5-0	19 x 24	130,000	..	..	..	..	American
	2	2-6-2	17 x 24	114,000	..	..	..	..	American



Tank Car Orders Predominated in 1919

## Car Lines Almost Only Buyers of Freight Cars

### Two-thirds of Orders Placed Made Up of Tank Cars—Little Foreign Business

THE NUMBER of freight cars ordered for domestic service in the United States in 1919 totaled only 29,893, marking, as brought out in the preceding article on locomotives, a figure so low as to make almost ridiculous a comparison with the domestic orders of previous years. There were ordered for service in Canada 3,837 freight cars and for export to other countries 3,994. These totals compared with domestic orders placed in 1918 for cars to be used in

TABLE I. THE FREIGHT CAR ORDERS OF 1919

For service in the United States*	22,062
For service in Canada	3,837
For export to other countries	3,994
<b>Total</b>	<b>29,893</b>

\*Including tank cars, 15,295.

the United States of 114,113; for roads in Canada, 9,657, and for the American forces in France and for export to other countries, 53,547.

The exceptionally small domestic total in 1919 resulted from the fact that the United States Railroad Administration

TABLE II. ORDERS FOR FREIGHT CARS SINCE 1901

Year	Domestic orders		Freight cars
	Domestic	Freight cars	
1901	193,439	1908	62,669
1902	195,248	1909	189,310
1903	108,936	1910	141,024
1904	136,561	1911	133,117
1905	341,315	1912	234,753
1906	310,315	1913	146,732
1907	151,711	1914	80,264
Domestic and foreign			
Year	Domestic	Foreign	Total
1915	109,792	18,222	128,014
1916	170,054	35,314	205,368
1917	79,367	53,191	132,558
1918	123,776	53,547	177,317

has placed no orders for cars in 1919 and that the railroads have ordered but a very few. In fact, the larger part of the orders that have been reported have been placed by private car lines, as is shown in no more striking manner than by

the fact that over two-thirds of the orders were for tank cars.

The orders for export, totaling in the neighborhood of but 4,000, were considerably below the totals of 1917 and 1918. They were less than one-fourth as great as those for 1915, the year in which the war demands began to make themselves effective. They were less than one-twelfth as great as in 1918. The domestic, Canadian and foreign orders combined were

TABLE III—FREIGHT CARS BUILT

	United States	Canada	Total
Domestic	94,981	6,391	101,372
Foreign	61,783	30	61,813
	156,764	6,421	163,185

Comparison with Previous Years

Year	Freight		
	Domestic	Foreign	Total
1899	117,982	1,904	119,886
1900	113,070	2,561	115,631
1901	132,591	4,359	136,950
1902	161,747	2,800	162,599
1903	153,195	1,613	152,801
1904	60,955	1,995	60,806
1905*	162,701	5,305	165,155
1906*	236,451	7,219	240,503
1907*	280,216	9,429	284,188
1908*	75,344	1,211	76,555
1909*	91,077	2,493	93,570
1910*	176,374	4,571	180,945
1911*	68,961	3,200	72,161
1912†	148,357	4,072	152,429

\*Includes Canadian output.

†Includes Canadian output and equipment built in company shops.

	United States			Canadian			Grand Total
	Domestic	Foreign	Total	Domestic	Foreign	Total	
1913	176,049	9,618	185,667	22,017	.....	22,017	207,684
1914	97,626	462	98,088	6,453	.....	6,453	104,451
1915	58,226	11,916	70,142	1,758	2,212	3,970	74,112
1916	111,516	17,905	129,421	.....	.....	5,580	135,001
1917	115,705	23,938	139,643	3,658	8,100	11,758	151,401
1918	67,063	40,981	108,044	14,704	1,960	16,664	124,708

only slightly over one-third as great as the domestic orders alone in the poorest year since 1901, namely, 1908, when but 62,669 cars were ordered for domestic service.

In the last year's review of the freight cars ordered and built in 1918 (*Railway Age*, January 3, 1919, page 86),



it was noted that the orders on hand at the end of 1918 promised a big year from the production standpoint in 1918. This promise has been borne out in a great measure at least. The production of freight cars in the United States in 1919 has totaled 156,764, of which 94,981 were for domestic service and 61,783 were for export. The total of 156,764 represents by no means as large a share of the productive capacity of the country as might be wished. It is, however, considerably in excess of the output of the car-building plants of the United States of 108,044 (124,708 including Canada) in 1918, or of 139,643 (151,401 including Canada) in 1917. In fact, it has been exceeded but twice since the big total of 284,188 (including Canada) in 1907, namely, in 1910, when there were produced in the United States and Canada 180,915 cars, and in 1913, when 207,684 were produced. In this connection it will be noted that a change in the compilation of the output figures has been made so that the United States and Canadian outputs have been separated, so as to show that of each country in more detail.

The unfortunate feature in the comparatively large output figures of 1919 is the small number for domestic use. While the total output is large it will be noted that for domestic use alone, while it is above the level of 1918, when 67,063 cars were produced for use in the United States, is not up to the totals of 1916 or 1917 even, in which years the output

of freight cars was not sufficient to keep up with the increasing demands of the business offered for railway transportation.

The comparison of output and new orders, as in the case of locomotives, shows that, whereas at the end of 1918 there was a promise for a comparatively large output in 1919, at the end of 1919 there is just the opposite promised for 1920. The books of the car builders are almost empty, and unfortunately they have ahead of them not even the small quantity of export orders that the locomotive builders have. The only solace of the situation is apparently the very evident fact that the railways of the country need cars badly and must have them in the immediate future.

The list of orders which follows is compiled from official sources. Letters were not mailed to the individual railroads this year, the small amount of data available concerning the railroads under federal control being obtained from the Railroad Administration. The usual inquiries were, however, sent to the private car lines, who offered their utmost co-operation in supplying the desired information. As in the case of the locomotive story preceding this article, the usual letters were sent to the builders. Through their co-operation the other material was amplified and corrected, and they also supplied the output figures quoted above and incorporated in the tables.

### Freight Car Orders in 1919

#### Domestic Orders

Purchaser	No.	Class	Capacity	Construction	Weight	Draft gear	Trucks	Roofs	Builder
Acme Petroleum Co.....	10	Tank	8,000g.	Steel	.....	.....	.....	.....	Gen. American
Akin Gasoline Co.....	10	Tank	10,000g.	Steel	.....	.....	.....	.....	Gen. American
Am. Cement & Plaster Co.....	1	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
American Cyanamid Co.....	10	Tank	100,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
American Linseed Co.....	10	Covered hop.	140,000	Steel	58,000	Miner	Arch bar	Steel	Gen. American
American Tar Co.....	4	Tank	10,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Arkansas City Pipe Line Co...	20	Tank	10,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
*Armour Car Lines.....	500	Steel under frames for	beef cars	.....	.....	.....	.....	.....	Am. Car & Fdy.
Arrow Refining Co.....	50	Tank	80,000	Steel	.....	Friction	.....	.....	Bettendorf
Arrow Refining Co.....	20	Tank	8,050g.	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Atlantic Coast Line.....	100	Phosphate	100,000	.....	.....	Friction	.....	.....	Penn. Tank Car
Bagdad Lumber Co.....	40	Logging	.....	Steel	.....	.....	.....	.....	Standard Steel
Balfour Williamson & Co.....	2	Tank	6,500g.	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Barrett Company.....	50	Ins. Tank	8,000g.	Steel	.....	Cardwell	.....	.....	Penn. Tank Car
Belcher Asphalt Paving Co.....	3	Tank	100,000	Steel	.....	Friction	.....	.....	Gen. American
Berry, Jas. B., Sons, Inc.....	50	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Bartlett, Aubrey.....	10	Tank	8,050g.	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Bigheart Prod. & Ref. Co.....	100	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Bigheart Prod. & Ref. Co.....	100	Tank	10,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Bioren & Co.....	100	Tank	80,000	Steel	.....	Friction	.....	.....	Penn. Tank Car
Bioren & Co.....	100	Tank	100,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Bolene Refining Co.....	25	Tank	8,050g.	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Bower, Henry, Chem. Mfg. Co..	1	Tank	100,000	Steel	.....	Friction	.....	.....	Penn. Tank Car
Brier Hill Steel Co.....	50	Gondola	140,000	Steel	45,026	Friction	Arch bar	.....	Am. Car & Fdy.
Brimstone R. R. & Canal Co....	23	Hopper	110,000	Steel	.....	Spring	.....	.....	Am. Car & Fdy.
Burker Hill & Sul. M. & C. Co..	7	Hopper	110,000	Steel	.....	Spring	.....	.....	Pressed Steel
Burkburnett Refining Co.....	50	Tank	8,050g.	Steel	.....	Friction	.....	.....	Pressed Steel
Cambria Steel Co.....	25	Gondola	140,000	Steel	.....	Friction	.....	.....	Penn. Tank Car
Cambria Steel Co.....	3	Flat	140,000	Steel frame	.....	Friction	.....	.....	Cambria
Cambria Steel Co.....	1	Hopper	140,000	Steel	.....	Friction	.....	.....	Cambria
Cambria Steel Co.....	1	Box	140,000	Steel frame	.....	Friction	.....	.....	Cambria
Cambria Steel Co.....	10	Gondola	140,000	Steel	.....	Friction	.....	.....	Cambria
Cambria Steel Co.....	1	Hopper	140,000	Steel	.....	Friction	.....	.....	Cambria
Cambria Steel Co.....	14	Gondola	140,000	Steel	.....	Friction	.....	.....	Cambria
Cambria Steel Co.....	2	Hopper	140,000	Steel	.....	Friction	.....	.....	Cambria
Carnegie Steel Co.....	2	Gondola	200,000	Steel	.....	Friction	.....	.....	Cambria
Central of New Jersey.....	1,000	Hopper	110,000	Steel	.....	.....	.....	.....	Pressed Steel
Central Steel Co.....	50	Gondola	100,000	Steel	.....	Spring	.....	.....	Standard Steel
Champion Fibre Co.....	1	Hopper	110,000	Steel	.....	Friction	.....	.....	Pressed Steel
Champlin Refining Co.....	80	Tank	100,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Champlin Refining Co.....	20	Tank	8,060g.	Steel	42,000	Sharon	Arch bar	.....	Am. Car & Fdy.
Champlin Refining Co.....	50	Tank	8,060g.	Steel	42,000	Sharon	Vulcan	.....	Penn. Tank Car
Chelsea Refining Co.....	50	Tank	8,060g.	Steel	.....	.....	.....	.....	Penn. Tank Car
*Chicago & North Western.....	25	Steel underframes for	caboose cars	.....	.....	.....	.....	.....	Am. Car & Fdy.
*Chicago, Milwaukee & St. Paul..	1,000	Box	80,000	.....	.....	.....	.....	.....	Bettendorf
*Chic., St. P., Minn. & Omaha..	1	Steel underframe for	caboose car	.....	.....	.....	.....	.....	Company shops
Chicago Short Line.....	15	Gondola	100,000	Steel frame	.....	Spring	.....	.....	Bettendorf
Chic., West Pullman & So.....	30	Hopper	140,000	Steel	.....	Friction	.....	.....	Pressed steel
Clarendon Refining Co.....	15	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Clow, James B., & Sons.....	1	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Commerce Petroleum Co.....	50	Tank	100,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Commercial Car Line.....	25	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Commercial Car Line.....	25	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Commercial Car Line.....	25	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Conley Car Co.....	100	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Conley Car Co.....	25	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Coopers Greek Chemical Co....	5	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Cosden & Co.....	4	Tank	10,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Cosden & Co.....	40	Tank	8,060g.	Steel	40,000	Cardwell G-11 A	Vulcan	.....	Am. Car & Fdy.
Cosden & Co.....	1	Tank	100,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Crescent Tank Line.....	40	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Crescent Tank Line.....	10	Tank	80,000	St. und' frame	60,000	Cardwell G-11	Arch bar	.....	Gen. American
Crescent Tank Line.....	10	Tank	80,000	St. und' frame	60,000	Cardwell G-11	Arch bar	.....	Am. Car & Fdy.

Items marked with an asterisk not included in totals.

Purchaser	No.	Class	Capacity	Construc- tion	Weight	Draft Gear	Trucks	Roofs	Builder
Crescent Portland Cement Co....	9	Hopper	110,000	Steel	.....	Spring	.....	.....	Pressed Steel
Crossett Lumber Co.....	50	Logging	30,000	Wood	.....	.....	.....	.....	Am. Car & Fdy.
Crown Oil & Ref. Co.....	300	Tank	8,000g.	.....	.....	.....	.....	.....	Am. Car & Fdy.
Cruikshank Bros.....	1	Pickle	60,000	Steel	.....	Spring	.....	.....	Pressed Steel
Crystal Car Line.....	50	Tank	8,000g.	Steel	42,000	Cardwell G-11	Arch bar	.....	Gen. American
Cudahy Oil Tank Line.....	25	Tank	100,000	All steel	41,500	Cardwell G-11	Arch bar	.....	Chic. Steel Car
Eagle Refining Co.....	50	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
East Erie Commercial R. R.....	1	Hopper	110,000	Steel	.....	Spring	.....	.....	Pressed Steel
Eastern Steel Co.....	5	Gondola	100,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Elk Creek Lumber Co.....	10	Logging	20,000	Wood	.....	Friction	.....	.....	Am. Car & Fdy.
Elk Refining Co.....	10	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Emery Mfg. Co.....	6	Tank	60,000	Steel	.....	Cardwell	Arch bar	.....	Al. St. Tank Car
Foco Oil Company.....	10	Tank	40,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Forney Cotton Oil & Ginning Co.	5	Tank	8,050g.	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Franklin Quality Ref. Co.....	5	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Franklin Quality Refining Co..	10	Tank	8,050g.	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Freedom Oil Works.....	50	Tank	10,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Freedom Oil Works.....	50	Tank	100,000	Steel	.....	Friction	.....	.....	Penn. Tank Car
General Chemical Co.....	10	Flat	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
General Equipment Co.....	1	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Georgia Rosin Products Co.....	2	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Gillican-Chipley Co., Inc.....	10	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Glen Nina Tank Line.....	50	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Greenleaf-Johnson Lbr. Co.....	25	Logging	.....	Wood	.....	.....	.....	.....	Penn. Tank Car
Gulf Refining Co.....	20	Tank	10,000g.	Steel	45,600	Cardwell G-11	Arch bar	.....	Am. Car & Fdy.
	50	Tank	8,000g.	Steel	40,500	Cardwell G-11	Arch bar	.....	Std. Tank Car
	100	Tank	8,000g.	Steel	40,500	Cardwell G-11	Arch bar	.....	Gen. American
	100	Tank	8,000g.	Steel	40,500	Cardwell G-11	Arch bar	.....	Gen. American
	100	Tank	8,000g.	Steel	40,500	Cardwell G-11	Arch bar	.....	Gen. American
	50	Tank	10,000g.	Steel	42,300	Cardwell G-11	Cast steel	.....	Gen. American
	50	Tank	8,000g.	Steel	42,000	Cardwell G-11	Cast steel	.....	Std. Tank Car
	100	Tank	8,000g.	Steel	42,000	Cardwell G-11	Cast steel	.....	Std. Tank Car
		Tank	8,000g.	Steel	42,000	Cardwell G-11	Arch bar	.....	Std. Tank Car
Refinery Co., H. & H.....	20	Tank	80,000	Steel	.....	Friction	.....	.....	Standard Steel
Hately Brothers Co.....	3	Tank	10,050g.	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Hewitt, D. E., Lbr. Co.....	6	Logging	20,000	.....	.....	.....	.....	.....	Penn. Tank Car
Holmes, Bulkley & Wardrop....	100	Tank	8,050g.	Steel	.....	.....	.....	.....	Am. Car & Fdy.
Hyman Pickle Co.....	1	Flat	80,000	St. und' frame	.....	Spring	.....	.....	Penn. Tank Car
Ill. Oil Co. of Rock Is.....	10	Tank	60,000	Steel	30,000	.....	.....	.....	Am. Car & Fdy.
	8	Tank	60,000	Steel	30,000	.....	.....	.....	Keith Ry. Equip.
Imperial Refining Co.....	100	Tank	80,000	Steel	.....	Friction	.....	.....	Standard Steel
Independent Refining Co.....	1	Tank	10,050g.	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Indian Refining Co.....	7	Oil Tank	8,000g.	Steel	39,000	Cardwell G-11	Arch bar	.....	Penn. Tank Car
	3	Acid Tank	7,000g.	Steel	40,600	Cardwell G-11	Arch bar	.....	Gen. American
International Vegetable Oil Co..	8	Tank	8,050g.	Steel	.....	Friction	.....	.....	Gen. American
Interstate R. R.....	510	Hopper	110,000	Steel	.....	Friction	.....	.....	Penn. Tank Car
Interstate Public Service Co...	5	Box	50,000	Wood	.....	.....	.....	.....	Pressed Steel
Interstate Tank Car Corp.....	25	Tank	8,000g.	Steel	41,000	Cardwell G-11	Arch bar	.....	Am. Car & Fdy.
	25	Tank	8,000g.	Steel	41,000	Bradford	Arch bar	.....	Am. Car & Fdy.
Island Refining Co.....	1,400	Tank	.....	.....	.....	.....	.....	.....	Chic. Steel Car
Kellogg & Sons, Spencer.....	6	Tank	100,000	Steel	.....	Cardwell G-11A	Arch bar	.....	Gen. American
Kendall Refining Co.....	3	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
	2	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
	2	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Kellys Creek Colliery Co.....	1	Caboose	.....	Wood	.....	.....	.....	.....	Am. Car & Fdy.
Kingan Refrigerator Line.....	100	Refrig.	60,000	St. ctr. sills	.....	Cardwell	Vulcan	Wood	Am. Car & Fdy.
Liberty Oil Co., Ltd.....	1	Tank	10,050g.	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Live Poultry Transit Co.....	100	Poultry	60,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Livingston Refiners Corp.....	20	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
	80	Tank	10,050g.	Steel	.....	Friction	.....	.....	Mt. Vernon
Long Bell Lumber Co.....	50	Logging	60,000	Wood	.....	.....	.....	.....	Penn. Tank Car
Lubrite Refining Co.....	50	Tank	100,000	Steel	.....	Friction	.....	.....	Penn. Tank Car
	20	Tank	100,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Lutcher & Moore.....	20	Logging	60,000	St. und' frame	.....	Spring	.....	.....	Am. Car & Fdy.
Magnolia Petroleum Co.....	20	Tank	100,000	Steel	.....	Friction	.....	.....	Bettendorf
	15	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
	25	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
	100	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
	100	Tank	100,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
	100	Tank	100,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Madera Sugar Pine Co.....	12	Logging	40,000	Wood	.....	.....	.....	.....	Am. Car & Fdy.
Manhattan Oil Co.....	100	Tank	.....	.....	.....	.....	.....	.....	Gen. American
Mexican Petroleum Corp.....	600	Tank	10,000g.	Steel	40,000	Cardwell	Arch bar	.....	Am. Car & Fdy.
	200	Tank	10,000g.	Steel	40,000	Cardwell	Arch bar	.....	Gen. American
	50	Tank	10,000g.	Steel	40,000	Cardwell	Arch bar	.....	Std. Tank Car
Mid-Co Gasoline Co.....	2	Tank	10,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Midland Packing Co.....	15	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Missouri, Kansas & Texas.....	300	Tank	.....	.....	.....	.....	.....	.....	Penn. Tank Car
Moore, Edgar M.....	1	Gondola	100,000	Steel	.....	Spring	.....	.....	Am. Car & Fdy.
National Aniline & Chemical Co.	1	Hopper	110,000	Steel	.....	Spring	.....	.....	Pressed Steel
	1	Gondola	100,000	Steel	.....	Spring	.....	.....	Pressed Steel
National Lamp Works.....	1	Hopper	110,000	Steel	.....	Spring	.....	.....	Pressed Steel
National Tube Co.....	5	Flat	140,000	Steel	.....	Friction	.....	.....	Pressed Steel
Newport News S. B. & D. D. Co.	1	Flat	240,000	Steel	.....	Friction	.....	.....	Pressed Steel
Noble, Chas. F., Oil & Gas Co..	50	Tank	80,000	Steel	.....	Friction	.....	.....	Pressed Steel
	50	Tank	100,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
	100	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
North American Car Co.....	50	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
	50	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Ohio Cities Gas Co.....	200	Tank	8,000g.	Steel	.....	Cardwell G-11A	Arch bar	.....	Am. Car & Fdy.
Ozarka Co.....	1	Tank	10,050g.	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
P. & F. Tank Line.....	40	Tank	8,000g.	Steel	41,700	Cardwell G-11	.....	.....	Penn. Tank Car
Paragon Refining Co.....	72	Tank	8,000g.	Steel	.....	Friction	.....	.....	Gen. American
	5	Tank	10,000g.	Steel	.....	Friction	.....	.....	Pressed Steel
Pease, F. M.....	20	Tank	8,050g.	Steel	.....	.....	.....	.....	Penn. Tank Car
	35	Tank	8,050g.	Steel	.....	.....	.....	.....	Penn. Tank Car
Pease, F. M.....	50	Tank	8,050g.	Steel	.....	.....	.....	.....	Penn. Tank Car
Pennsylvania.....	3,000	Hopper	140,000	Steel	.....	Friction	.....	.....	Penn. Tank Car
Penn. American Refining Co...	1	Tank	80,000	Steel	.....	Cardwell	Cast steel	.....	Camhria
Pennsylvania Tank Line.....	181	Tank	10,050g.	Steel	.....	Friction	.....	.....	Std. Tank Car
	699	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Perry, Chas. T., & Co.....	1	Tank	100,000	Steel	.....	Friction	.....	.....	Penn. Tank Car
Petroleum Refining Co.....	14	Tank	8,050g.	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
	2	Tank	6,500g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Peytona Lumber Co.....	10	Logging	30,000	Wood	.....	.....	.....	.....	Penn. Tank Car
Phoenix Cotton Oil Co.....	1	Tank	8,050g.	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Rainey Wood Coke Co.....	20	Coke	100,000	Steel	.....	Spring	.....	.....	Penn. Tank Car
	1	Gondola	100,000	Steel	.....	Spring	.....	.....	Pressed Steel
	15	Coke	100,000	Steel	.....	Spring	.....	.....	Pressed Steel
Ranger Refining Co.....	25	Tank	8,000g.	Steel	.....	.....	.....	.....	Pressed Steel
	25	Tank	10,000g.	Steel	.....	.....	.....	.....	Am. Car & Fdy.
	20	Tank	10,050g.	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Red River & Gulf.....	1	Caboose	60,000	Steel	.....	Spring	.....	.....	Penn. Tank Car
Rodger Ballast Car Co.....	1	Ballast	100,000	Steel	.....	Friction	.....	.....	Mt. Vernon



Purchaser	No.	Class	Capacity	Construction	Weight	Draft Gear	Trucks	Roofs	Builder
Roxana Petroleum Co. of Okla.	75	Tank	100,000	Steel	45,800	.....	.....	.....	Std. Tank Car
Sheet & Tube Co. of Am.	25	Tank	100,000	Steel	40,800	.....	.....	.....	Std. Tank Car
Sacramento Northern	25	Box	80,000	Steel	.....	Spring	.....	.....	Mt. Vernon
Shell Co. of Calif.	8	Coke	100,000	Steel	.....	Friction	.....	.....	Pressed Steel
Simms Oil Co.	3	Tank	10,000g.	Steel	.....	Cardwell G-11A	Arch bar	.....	Am. Car & Fdy.
Smethport Extract Co.	3	Tank	10,000g.	Steel	.....	Cardwell G-11A	Arch bar	.....	Penn. Tank Car
Snyder, T. E.	10	Tank	100,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Sloss Sheffield Steel & Iron Co.	25	Tank	100,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Southern Extract Co.	1	Coke	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Sparks Circus	4	Tank	100,000	Steel	.....	Friction	.....	.....	Pressed Steel
Staley, A. E., Mfg. Co.	1	Flat	60,000	Wood	.....	Spring	.....	.....	Am. Car & Fdy.
St. Mary's Gas Co.	1	Stock	60,000	Wood	.....	Spring	.....	.....	Mt. Vernon
Standard Oil Co. of La.	2	Elephant	60,000	Wood	.....	Spring	.....	.....	Mt. Vernon
Standard Tin Plate Co.	2	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Stauffer Chemical Co.	2	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Steinbeck Lumber Co.	10	Hopper	110,000	Steel	.....	Spring	.....	.....	Pressed Steel
Sterling Oil & Refin. Co.	25	Tank	100,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Stoll Oil Co.	10	Logging	30,000	Wood	.....	Spring	.....	.....	Am. Car & Fdy.
Stroud, B. B., Co.	15	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Sun Co.	75	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
*Swift & Co.	300	Tank	80,000g.	Steel	.....	Friction	.....	.....	Pressed Steel
Terre Haute, Ind. & Eastern	2	Steel underframes for beef cars	100,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Texas Co.	15	Box	60,000	Wood	.....	.....	.....	.....	Bettendorf
Texas & Pacific	4	Tank	5,000g.	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Transcontinental Oil Co.	110	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Trumbull Steel Co.	100	Tank	100,000	Steel	.....	Friction	.....	.....	Penn. Tank Car
Union Tank Car Co.	3,500	Flat	150,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
	750	Tank	100,000	Steel	51,000	Cardwell	Side frame	.....	Pressed Steel
	500	Tank	100,000	Steel	51,000	Cardwell	Side frame	.....	Standard Steel
	250	Tank	100,000	Steel	51,000	Cardwell	Side frame	.....	Pressed Steel
	250	Tank	100,000	Steel	51,000	Waugh	Side frame	.....	Cambria
	250	Tank	100,000	Steel	51,000	Miner	Side frame	.....	Cambria
	250	Tank	100,000	Steel	51,000	National	Side frame	.....	Company shops
United States Government	200	N. g. gondola	22,000	St. und' frame	.....	Spring	.....	.....	Company shops
U. S. Industrial Alcohol Co.	114	Tank	8,050g.	Steel	.....	Friction	.....	.....	Ralston
U. S. Navy	10	Tank	10,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
U. S. Stores Co.	4	Flat	150,000	Steel	.....	Friction	.....	.....	Penn. Tank Car
United Verde Copper Co.	11	Box	100,000	Steel	.....	Friction	.....	.....	Pressed Steel
	6	Gondola	100,000	Steel	.....	Friction	.....	.....	Mt. Vernon
Universal Steel Co.	2	Gondola	100,000	Steel	.....	Friction	.....	.....	Pressed Steel
Walsh, John R.	2	Tank	8,050g.	Steel	.....	Spring	.....	.....	Pressed Steel
	3	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Walsh, John R.	1	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Warner-Quinlan Co.	10	Tank	80,000	Steel	.....	Friction	.....	.....	Penn. Tank Car
	3	Tank	100,000	Steel	.....	Friction	.....	.....	Penn. Tank Car
Warren Oil Co. of Penn.	200	Tank	8,000g.	Steel	80,000	Cardwell	Arch bar	.....	Am. Car & Fdy.
	9	Tank	10,000g.	Steel	100,080	Cardwell	Arch bar	.....	Am. Car & Fdy.
	10	Tank	6,000g.	Steel	80,000	Cardwell	Arch bar	.....	Allegheny Steel
Weirton Steel Co.	2	Flat	140,000	Steel	.....	.....	.....	.....	Gen. American
West Penn Power Co.	70	Hopper	110,000	Steel	.....	Friction	.....	.....	Gen. American
White Eagle Oil & Refin.	20	Tank	80,000	Steel	.....	Friction	.....	.....	Pressed Steel
White Oil Corp.	300	Tank	100,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Wilburine Oil Works	5	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Wilhoit Refining Co.	6	Tank	8,050g.	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Willits & Patterson	10	Tank	10,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Witte, John H., & Sons	20	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
	25	Tank	80,000	Steel	.....	Friction	.....	.....	Std Tank Car
	25	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.

## Orders from Railways and Other Companies in Canada

American Cyanide	6	Transfer	.....	.....	.....	.....	.....	.....	Can. Car & Fdy.
Anglo - Newfoundland Development	16	Box	.....	.....	.....	.....	.....	.....	Can. Car & Fdy.
	12	Flat	.....	.....	.....	.....	.....	.....	Can. Car & Fdy.
	4	Caboose	.....	.....	.....	.....	.....	.....	Can. Car & Fdy.
British American Nickel Corp.	1	.....	70,000	Steel	.....	Friction	.....	.....	Eastern Car
Canadian National	750	Box	.....	.....	.....	.....	.....	.....	National
	300	Stock	.....	.....	.....	.....	.....	.....	National
	500	Stock	.....	.....	.....	.....	.....	.....	Can. Car & Fdy.
	150	Refrig.	.....	.....	.....	.....	.....	.....	Can. Car & Fdy.
	250	Ballast	.....	.....	.....	.....	.....	.....	Can. Car & Fdy.
	550	Gen'l service	100,000	Steel frame	.....	Spring	.....	.....	Eastern Car
	500	Flat	80,000	St. und' frame	.....	Friction	.....	.....	Eastern Car
	6	Snow plows	.....	Steel frame	.....	Friction	.....	.....	Eastern Car
	80	Caboose	.....	.....	.....	.....	.....	.....	Can. Car & Fdy.
Canadian Pacific	140	Ore	.....	.....	.....	.....	.....	.....	Can. Car & Fdy.
Citadel Brick Co.	125	Dryer	.....	.....	.....	.....	.....	.....	Can. Car & Fdy.
Grand Trunk	44	Box	.....	.....	.....	.....	.....	.....	Can. Car & Fdy.
	2	Stock	.....	.....	.....	.....	.....	.....	Can. Car & Fdy.
Imperial Oil, Ltd.	100	Tank	100,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Imperial Oil Co.	300	Tank	.....	.....	.....	.....	.....	.....	Can. Car & Fdy.
Southern Alberta Refineries	1	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.

## Orders from Other Countries

American Metal Co.	2	Tank	80,000	Steel	.....	Spring	.....	.....	Am. Car & Fdy.
Am. Smelt. & Ref. Co.	16	Ore	200 cu.ft.	Steel	.....	Spring	.....	.....	Am. Car & Fdy.
Anglo-Mexican Pet. Co.	2	Tank	100,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Argentine North Eastern	30	Flat	60,000	St. und' frame	.....	.....	.....	.....	Am. Car & Fdy.
Baragua Sugar Co.	3	Tank	8,000g.	Steel	.....	Friction	.....	.....	Pressed Steel
Broken Hill Prop. Co., Ltd.	12	Hopper	100,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Buenos Aires Ry.	6	Tank	10,000g.	Steel	.....	.....	.....	.....	Am. Car & Fdy.
Burma Mines	50	Ore	40,000	Steel	.....	.....	.....	.....	Pressed Steel
Caribbean Petroleum Co.	2	Tank	30,000	Steel	.....	Spring	.....	.....	Am. Car & Fdy.
Central (Argentine)	20	Tank	.....	.....	.....	.....	.....	.....	Am. Car & Fdy.
Central Adelaide	20	Cane	60,000	Steel	.....	Spring	.....	.....	Am. Car & Fdy.
Central Patria	20	Cane	60,000	Steel	.....	Spring	.....	.....	Am. Car & Fdy.
Central Cabaiguan	10	Cane	60,000	St. und' frame	.....	Friction	.....	.....	Am. Car & Fdy.
Central Cunagua	60	Cane	60,000	St. und' frame	.....	Friction	.....	.....	Am. Car & Fdy.
	20	Cane	60,000	St. und' frame	.....	Friction	.....	.....	Am. Car & Fdy.
	30	Cane	60,000	St. und' frame	.....	Spring	.....	.....	Am. Car & Fdy.
Central Estrella	30	Cane	60,000	St. und' frame	.....	Spring	.....	.....	Am. Car & Fdy.
Central Josefito	30	Cane	60,000	St. und' frame	.....	Friction	.....	.....	Am. Car & Fdy.
Central Toledo	30	Cane	60,000	St. und' frame	.....	Friction	.....	.....	Am. Car & Fdy.
Central R. R. of Peru	60	Flat	77,150	Steel	.....	Spring	.....	.....	Am. Car & Fdy.
Cerro de Pasco	20	Ore	80,000	Steel	.....	Spring	.....	.....	Am. Car & Fdy.
Cerro de Pasco (Peru)	80	Flat	60,000	Steel	.....	Spring	.....	.....	Am. Car & Fdy.
Chile Exploration Co.	50	Ore	140,000	Steel	.....	Friction	.....	.....	Pressed Steel
Cintas, O. B.	40	Cane	60,000	St. und' frame	.....	Spring	.....	.....	Pressed Steel
Colombian Northern	12	Gondola	40,000	St. und' frame	.....	.....	.....	.....	Am. Car & Fdy.
Cuban American Sugar Co.	100	Cane	30,000	Steel	.....	Spring	.....	.....	Am. Car & Fdy.

Purchaser	No.	Class	Capacity	Construction	Weight	Draft Gear	Trucks	Roofs	Builder
Cuba Co.	150	Box	80,000	Steel frame	.....	Friction	.....	.....	Am. Car & Fdy.
Cuba Northern Rys.	250	Flat	60,000	Steel frame	.....	Friction	.....	.....	Am. Car & Fdy.
Cuban Central	200	Box	60,000	Steel frame	.....	Friction	.....	.....	Am. Car & Fdy.
	200	Flat	.....	.....	.....	.....	.....	.....	Pressed Steel
	50	N. g. cane	30,000	.....	.....	.....	.....	.....	Standard Steel
Cuyamal Fruit Co. (for Hond.)	15	Fruit	.....	.....	.....	.....	.....	.....	Gregg
Dollar, R., Co. (Tao Ching Ry)	100	Gondola	80,000	Steel	.....	Spring	.....	.....	Magor
Destileria San Juan Matanzas..	5	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Destileria El Infierno.....	5	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
*Federated Malay States.....	150	Underframes for coal cars	.....	.....	.....	.....	.....	.....	Am. Car & Fdy.
Garcis, Marcelino.....	10	Cane	60,000	St. und' frame	.....	Spring	.....	.....	Magor
Jamaica Gov't Rys.....	12	Flat	.....	.....	.....	.....	.....	.....	Magor
Jamaica Government.....	30	Cane	.....	.....	.....	.....	.....	.....	Nat'l Steel
Leon, Domingo.....	36	Box	60,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Mecke & Co.....	25	Cane	60,000	Steel	.....	Spring	.....	.....	Am. Car & Fdy.
Miranda Sugar Co.....	5	Flat	20,000	Wood	.....	Friction	.....	.....	Am. Car & Fdy.
	2	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
	2	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Pekin Suiyuan (China).....	100	Gondola	80,000	.....	.....	.....	.....	.....	Gen. American
	500	Gondola	80,000	.....	.....	.....	.....	.....	Gen. American
Santa Cecilia Sugar Corp.....	12	Cane	60,000	St. und' frame	.....	Vulcan	.....	.....	Am. Car & Fdy.
South African Railways.....	300	Gondola	80,000	Steel	.....	.....	.....	.....	Pressed Steel
	200	Gondola	60,000	Steel	.....	.....	.....	.....	Pressed Steel
South Porto Rico Sugar Co.....	65	Cane	60,000	Steel	.....	Spring	.....	.....	Am. Car & Fdy.
Tela R. R. (Honduras).....	50	Fruit	60,000	.....	.....	.....	.....	.....	Magor
Trinidad Gov't Rys.....	70	Cane	.....	.....	.....	.....	.....	.....	Magor
United Fruit Co.....	4	Tank	5,000g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
	2	Tank	6,500g.	Steel	.....	Friction	.....	.....	Pressed Steel
United Rys of Havana.....	300	Box	60,000	St. und' frame	.....	.....	.....	.....	Standard Steel
	300	Flat	.....	.....	.....	.....	.....	.....	Standard Steel
Violet Sugar Co.....	25	Ballast	80,000	.....	.....	.....	.....	.....	Am. Car & Fdy.
	10	Cane	60,000	St. und' frame	.....	Friction	.....	.....	Am. Car & Fdy.

### Passenger Car Orders in 1919

#### Domestic Orders

Purchaser	No.	Class	Construction	Weight	Lighting	Axle generator equipment	Batteries	Builder
Arms, Pal. Horse Car Co.....	1	Horse	St. und' frame	.....	None	.....	.....	Pullman
	25	Horse	St. und' frame	.....	None	.....	.....	Pullman
Atlantic Coast Line.....	2	Dining	Steel	.....	Electric	.....	.....	Pullman
Butler County.....	1	Unit	Steel	.....	Electric	.....	.....	Unit Ry. Car
Florida East Coast.....	1	Dining	Steel	.....	Electric	.....	.....	Pullman
Nash., Chattanooga & St. Louis	1	Bag & mail	All steel	.....	Electric	Stone-Franklin	Edison	Am. Car & Fdy.
	4	Baggage	All steel	.....	Electric	Stone-Franklin	Edison	Am. Car & Fdy.
	4	Coaches	All steel	.....	Electric	Stone-Franklin	Edison	Am. Car & Fdy.
	2	Coaches	All steel	.....	Electric	Stone-Franklin	Edison	Am. Car & Fdy.
Pullman Car Lines.....	150	Sleeping	Steel	.....	Electric	.....	.....	Pullman
St. Louis, Brownsville & Mexico	10	Coaches	All steel	.....	Electric	Safety	Willard	Am. Car & Fdy.
	5	Baggage	All steel	.....	Electric	Safety	Willard	Am. Car & Fdy.
Southern Pacific.....	15	Baggage	Steel	.....	Electric	.....	.....	Pullman
Texas Pacific.....	50	Coaches	Steel	.....	Electric	.....	.....	Pullman
	12	Bag. & express	Steel	.....	Electric	.....	.....	Pullman
	5	Dining	Steel	.....	Electric	.....	.....	Pullman
	2	Postal	Steel	.....	Electric	.....	.....	Pullman
Saratoga & Encampment.....	1	200hp., 70 ft gasoline mechanical drive.	Steel	.....	Electric	.....	.....	McKeen
Washington Southern.....	1	Dining	Steel	.....	Electric	.....	.....	Pullman

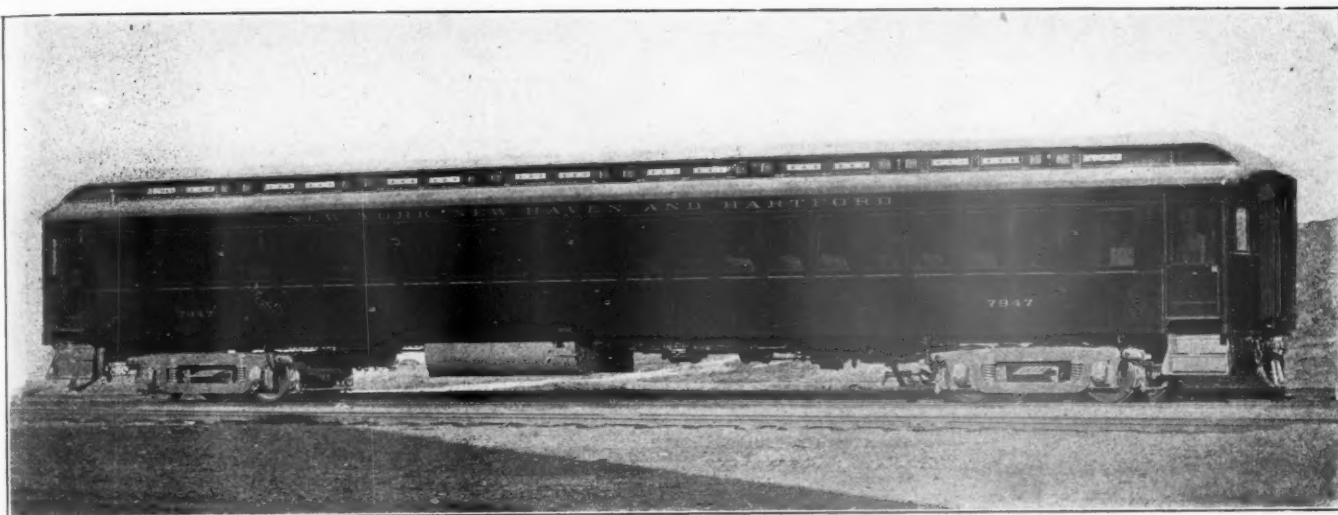
#### Orders from Railways and Other Companies in Canada

Purchaser	No.	Class	Construction	Weight	Lighting	Axle generator equipment	Batteries	Builder
Canadian National.....	80	Colonist	.....	.....	.....	.....	.....	Can. Car & Fdy.
	30	Baggage	.....	.....	.....	.....	.....	Can. Car & Fdy.
	18	Sleeping	.....	.....	.....	.....	.....	Can. Car & Fdy.
	9	Dining	.....	.....	.....	.....	.....	Can. Car & Fdy.
	20	Tourist	.....	.....	.....	.....	.....	Can. Car & Fdy.
	20	1st class	.....	.....	.....	.....	.....	Can. Car & Fdy.
	20	Mail	.....	.....	.....	.....	.....	Can. Car & Fdy.
	13	Observation	.....	.....	.....	.....	.....	Can. Car & Fdy.
Canadian Pacific.....	50	Colonist	.....	.....	.....	.....	.....	Pullman
	30	Tourist	.....	.....	.....	.....	.....	Can. Car & Fdy.
	12	Dining	.....	.....	.....	.....	.....	Can. Car & Fdy.
	24	Baggage	.....	.....	.....	.....	.....	Can. Car & Fdy.
Grand Trunk.....	9	Comp'y tourist	.....	.....	.....	.....	.....	Can. Car & Fdy.
		Mail	.....	.....	.....	.....	.....	Can. Car & Fdy.

#### Orders from Other Countries

Purchaser	No.	Class	Construction	Weight	Lighting	Axle generator equipment	Batteries	Builder
Colombian Northern.....	1	Observation	St. und' frame	.....	Oil	.....	.....	Am. Car & Fdy.
Compania De Argamasilla-Tomelloso (Spain).....	1	200hp. gasoline mechanical drive.	.....	.....	.....	.....	.....	McKeen
Cuba Co.....	5	1st class	St. und' frame	.....	Electric	Safety	Edison	Am. Car & Fdy.
	10	2d class	St. und' frame	.....	Electric	Safety	Edison	Am. Car & Fdy.
	5	Bag. & mail	St. und' frame	.....	Electric	Safety	Edison	Am. Car & Fdy.
	5	Express	St. und' frame	.....	Electric	Safety	Edison	Am. Car & Fdy.
	1	Private	St. und' frame	.....	Electric	Safety	Edison	Am. Car & Fdy.
Cuba R. R.....	6	Passenger	.....	.....	.....	.....	.....	Pullman
*Federated Malay States.....	60	Steel underframes for passenger cars.	.....	.....	.....	.....	.....	Nat'l Steel
Grace, W. R., & Co.....	1	Comb. 1st & 2d cl.	St. und' frame	.....	Oil	.....	.....	Am. Car & Fdy.
Int. Rep. of Central America..	1	1st class	Wood	.....	.....	.....	.....	Am. Car & Fdy.
	2	2d class	Wood	.....	.....	.....	.....	Am. Car & Fdy.
	1	Bag & mail	Wood	.....	.....	.....	.....	Am. Car & Fdy.
Madrid, Saragossa & Alicante....	20	2d class	St. und' frame	.....	Gas	.....	.....	Am. Car & Fdy.
	30	3d class	St. und' frame	.....	Gas	.....	.....	Am. Car & Fdy.
Manila.....	25	3d class	St. und' frame	.....	Electric	Stone	.....	Am. Car & Fdy.
Mecke & Co.....	2	1st class	Wood	.....	Oil	.....	.....	Am. Car & Fdy.
	3	2d class	Wood	.....	Oil	.....	.....	Am. Car & Fdy.
	4	3d class	Wood	.....	Oil	.....	.....	Am. Car & Fdy.
United Rys. of Havana.....	8	1st class	St. und' frame	.....	.....	.....	.....	Wason
	12	3d class	St. und' frame	.....	.....	.....	.....	Wason





## Passenger Car Orders Show Upward Trend

Production in 1919 Lowest on Record, but Prospects Are for Better Business

THE FIGURES showing the new orders and the production of passenger cars in 1919 indicate that that industry has as yet by no means recovered from the practical cessation of business resulting from the war and its attending circumstances. The number of passenger cars ordered

use and 92 for export. In fact, the output of passenger cars in 1919 was the lowest since the compilation of these figures was begun.

The orders on hand for passenger cars at present promise a somewhat larger year from the production standpoint in

TABLE I. THE PASSENGER CAR ORDERS OF 1919

For service in the United States .....	292
For service in Canada.....	347
For export to other countries.....	143
<b>Total .....</b>	<b>782</b>

in 1919 totaled 782, of which 292 were for service in the United States, 347 for Canada and 143 for export. Owing to the fact that there have been a number of passenger car orders placed within the last few weeks these numbers are

TABLE II. ORDERS FOR PASSENGER CARS SINCE 1901

Domestic orders only			
Passenger cars		Passenger cars	
1901.....	2,879	1909.....	4,514
1902.....	3,459	1910.....	3,881
1903.....	2,310	1911.....	2,623
1904.....	2,213	1912.....	3,642
1905.....	3,289	1913.....	3,179
1906.....	3,402	1914.....	2,002
1907.....	1,791	1915.....	3,101
1908.....	1,319		
Domestic and Foreign			
Year	Domestic	Foreign	Total
1916 .....	2,544	109	2,653
1917 .....	1,124	43	1,167
1918 .....	131	26	157

considerably in excess of those of 1918, when 131 cars were ordered for domestic service and 26 for export, but, of course, they are not at all up to the totals for 1917.

The production of passenger cars in the car building plants of the United States in 1919 (excluding Canada), totaling 466, of which 306 were for domestic use and 85 for export, is likewise far below the output for 1918, when 1,573 cars were built, including 1,481 cars for domestic

TABLE III—PASSENGER CARS BUILT

	United States	Canada	Total
Domestic .....	306	160	466
Foreign .....	85	.....	85
	391	160	551

Comparison with Previous Years

Year	Passenger		Total
	Domestic	Foreign	
1899 .....	1,201	104	1,305
1900 .....	1,515	121	1,636
1901 .....	1,949	106	2,055
1902 .....	From 1902 to 1907 passenger car figures in these two columns included in corresponding frt. car columns.		1,948
1903 .....			2,007
1904 .....			2,144
1905* .....			2,551
1906* .....			3,167
1907* .....	.....	.....	5,457
1908* .....	1,645	71	1,716
1909* .....	2,698	151	2,849
1910* .....	4,136	276	4,412
1911* .....	3,938	308	4,246
1912† .....	2,822	238	3,060

\*Includes Canadian output.

†Includes Canadian output and equipment built in company shops.

	United States			Canadian			Grand Total
	Domestic	Foreign	Total	Domestic	Foreign	Total	
1913 .....	2,559	220	2,779	517	.....	517	3,296
1914 .....	3,310	56	3,366	325	.....	325	3,691
1915 .....	1,852	14	1,866	83	.....	83	1,949
1916 .....	1,732	70	1,802	37	.....	37	1,839
1917 .....	1,924	31	1,955	45	.....	45	2,000
1918 .....	1,480	92	1,572	1	.....	1	1,503

1920 than in 1919, and the fact that a buying movement has begun during the past few weeks should indicate that orders are to be expected in the near future on a much larger scale than has been typical of the year just past.

The tables showing the orders for passenger train cars are given on the opposite page.



## Exports of Railway Supplies Break all Records

Figures for Only First Ten Months Rival Totals for  
Full Years from 1914 to 1918

**A**N ANALYSIS of the figures for exports of railway supplies during the first ten months of 1919, that being the extent to which figures for the year are thus far available, brings out the interesting fact that with certain exceptions the exports for these ten months alone have been in excess of the exports of any entire year back to 1914. Taking rails as one important item, it is noted that the exports of this commodity to October 31 this year have totaled 568,065 tons, valued at \$36,348,148. This tonnage has been exceeded only by that of all of 1916, in which year, however, because of the difference in prices the value of the exports of rails was considerably less.

The exports of freight cars in the first ten months of 1919 have totaled 19,253, valued at \$45,578,934, as compared with the best preceding year, 1917, when freight cars valued at \$26,769,793 were exported. The exports of freight cars in June, 1919, alone exceeded the exports of freight cars in all of 1918, this excluding, of course, the cars shipped overseas during that year for the American Expeditionary Forces. The exports of car wheels and axles for the ten months of 1919, totaling \$10,533,448, are over double those for all twelve months of 1918 and several times those of the years immediately preceding.

The exports of locomotives for 1919 have not bulked so large. The number for the ten months has been about the same as in 1916, for which year, however, the value of locomotives exported was but half that of the ten months of this year. The number of locomotives exported from January to October this year has been about one-half the exports for either 1917 or 1918, although the values are more nearly comparable.

The year 1919 will, if the hopes of the advocates of export trade in the railway supply field come to pass, take its place in history as the year in which the war-time demands for railway equipment turned themselves into the more permanent trade of peace. While it is true that the export orders for cars and locomotives placed on the books have not been as large as might have been expected or desired, the above resumé will show that 1919 has made a most creditable record from the standpoint of export accomplishment.

Through the efforts of the Division of Statistics of the Bureau of Foreign and Domestic Commerce the business papers of the country have been enabled since January, 1919, to give their readers accurate and detailed figures of the monthly exports of their respective industries by countries of destination. The railway supply field has been covered under four heads, "Steam Locomotives," "Freight and Passenger Cars for Steam Railroads," "Car Wheels and Axles" and "Railway Track Material," and the monthly reports for these commodities have been published in the Foreign Railway News column of the *Railway Age* as soon as they have been made available.

### Locomotive Exports

The totals of exports of steam locomotives for each of the ten months to October this year have been compiled for purposes of this article in Table I. From this table it will be observed that there were exported from this country, from

TABLE I. EXPORTS OF STEAM LOCOMOTIVES

	Number	Value
January .....	87	\$3,076,543
February .....	85	2,584,269
March .....	27	852,224
April .....	55	2,193,168
May .....	97	4,040,551
June .....	78	2,356,909
July .....	17	322,775
August .....	69	1,539,540
September .....	78	2,326,339
October .....	170	5,284,019
Total for ten months of 1919.....	763	\$24,576,337
Comparison With Previous Years (Entire 12 Months)		
Year	Number	Value
1914 .....	383	\$3,692,225
1915 .....	228	2,115,866
1916 .....	799	12,665,877
1917 .....	1,442	18,243,248
1918 .....	1,457	35,889,632

January 1 to October 31 this year, a total of 763 locomotives, valued at \$24,576,337. Comparing these figures with those of the preceding years, 1914 and 1918, at the bottom of the table it will be noted that the number of locomotives exported in the first ten months of 1919 alone was twice that of the



entire twelve months of 1914, over three times as great as the total for 1915, about the same as in 1916, but only about one-half the totals for 1917 and 1918.

This brings out in a striking way the great expansion of our export trade in locomotives due to the war, and emphasizes the usefulness of the steam locomotive as an instrument of warfare. The differences in value as between the several years given is not alone due to the increase in cost of railway motive power. It is also due to the fact that the United States has taken a new place in locomotive export trade and is now producing larger locomotives and in larger quantities than before the war. As far as 1919 itself is concerned, there is but little to say. Large shipments have been made to Italy, while Japan and Cuba have been regular purchasers. There have also been shipments to Russia on older orders noted from time to time.

### Freight and Passenger Exports

Table II shows the exports of cars, freight and passenger. The table is a striking one, in that it shows for these ten months of 1919 exports of freight cars so considerably in excess of those of any of the five preceding years. The record for June alone is in excess of the entire export shipments in 1918, from the point of view of value, although not from that of number.

TABLE II. EXPORTS OF FREIGHT AND PASSENGER CARS

Month	Freight		Passenger	
	No.	Value	No.	Value
January	351	\$509,644	6	\$36,807
February	583	957,128	225	130,768
March	284	668,904	5	18,552
April	1,005	1,913,728	8	145,141
May	3,008	6,268,078	44	960,616
June	5,055	13,675,186	11	173,929
July	1,986	4,146,923	....	....
August	2,888	4,721,439	1	1,800
September	1,774	3,538,002	12	81,975
October	4,319	9,179,902	5	13,950
Total for 10 months...	19,253	\$45,578,934	317	\$1,563,538

Comparison With Previous Years (Entire 12 Months).

Month	Freight		Passenger	
	No.	Value	No.	Value
1914	....	\$5,390,705	....	\$2,018,853
1915	....	1,198,806	....	509,024
1916	....	23,298,759	....	820,518
1917	....	26,769,793	....	815,791
1918	10,303	12,821,936	75	228,698

Table III gives the exports of car wheels and axles. The total for the ten months of 1919 is to be compared properly only with that for the year 1918, for the figures for the previous years give only car wheel exports and not car wheels and axles combined. Nevertheless, the fact that the exports for the ten months noted are in excess of those of all of last year is encouraging. The shipments during the year, as in the case of the other exports, have been to all parts of the world, although Japan, Italy and Canada have been especially large customers.

TABLE III. EXPORTS OF CAR WHEELS AND AXLES

Month	Value	June	Value
January	\$278,393	July	1,292,291
February	541,630	August	1,302,546
March	686,281	September	1,013,440
April	946,304	October	962,351
May	769,733		
		Total for 10 mos.	\$10,533,448

Comparison With Previous Years (Entire 12 Months)

Year	Value	Year	Value
1914	\$414,371	1917	2,385,973
1915	183,290	1918	5,220,704
1916	741,542	Car wheels only prior to 1918.	

### Track Material

Inasmuch as the orders for railway track material are not reported in as great detail as orders for cars and locomotives, Table IV showing the exports of railway track material should be of particular interest. The figures show that in the ten months ending in October only this country has exported 568,065 tons of rails, valued at \$36,348,148—

more from the standpoint of value than in any full year from 1914 to 1918, with the exception of 1917, when 594,389 tons were exported, and so much more from the standpoint of value as to indicate that for the full year the totals for 1919 will approach an amount double that of the best preceding year. The exports of track spikes compare similarly, with the exception that 1916 takes the place that 1917 takes in the case of steel rails. The exports of switches, frogs, splice bars, also present encouraging totals.

TABLE IV. EXPORTS OF RAILWAY TRACK MATERIAL

Month	Spikes		Rails		Switches, frogs, splice bars, etc. Dollars
	Pounds	Dollars	Tons	Dollars	
January	3,509,054	189,408	65,024	4,221,563	543,330
February	4,206,228	258,073	66,900	6,023,982	905,264
March	4,185,816	193,987	48,955	3,051,611	515,535
April	7,799,630	413,292	60,463	3,416,590	1,063,437
May	6,642,827	437,392	76,134	4,902,970	1,881,626
June	9,727,943	484,466	67,028	4,208,872	1,359,725
July	3,803,927	209,054	32,707	1,870,583	289,232
August	4,009,107	216,154	48,700	2,768,558	538,914
September	4,298,046	179,197	58,424	3,403,771	473,753
October	2,899,162	130,941	43,730	2,479,648	533,246
Total for 10 mos...	51,081,740	2,711,964	568,065	36,348,148	8,104,062

(Comparison With Previous Years (Entire 12 Months))

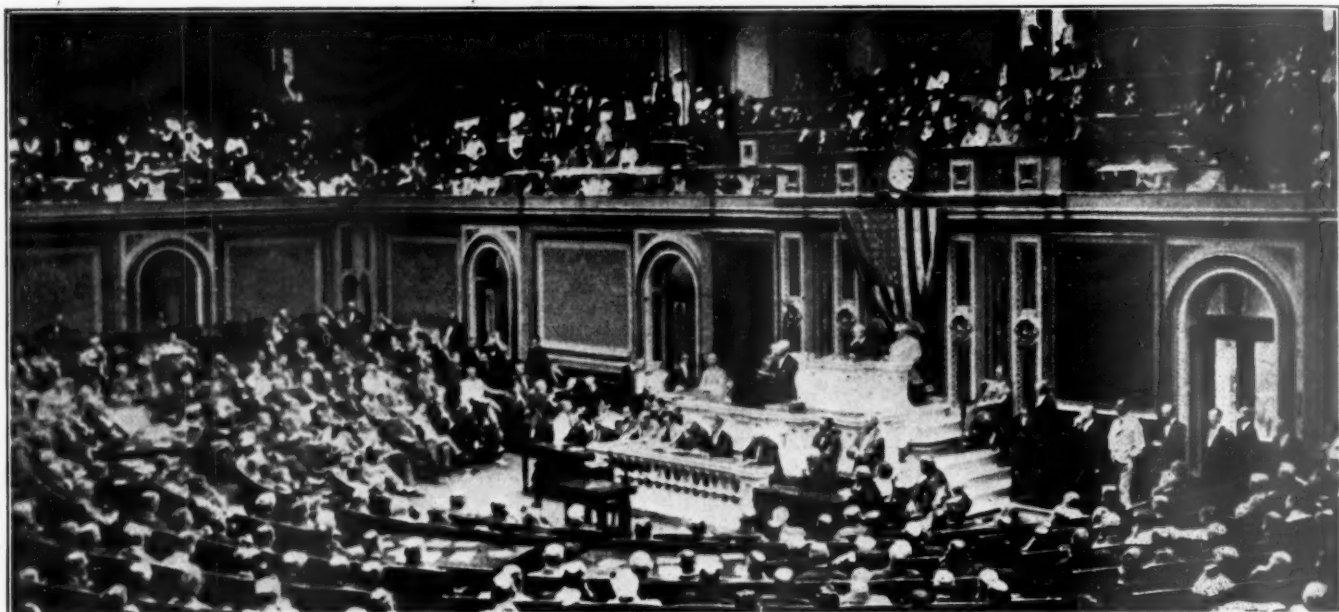
Year	Spikes		Rails		Switches, frogs, splice bars, etc. Dollars
	Pounds	Dollars	Tons	Dollars	
1914	19,564,618	346,034	338,713	10,259,109	2,534,148
1915	12,289,203	203,663	159,587	4,537,978	2,407,490
1916	59,145,818	1,398,514	537,918	17,631,756	5,261,944
1917	42,809,961	1,502,430	594,389	25,405,469	9,108,617
1918	34,832,142	1,722,922	430,347	22,817,400	6,286,369

Considering the 1919 totals for exports of track material alone, it is worth noting that our best customers for the year have been Japan, France and Cuba.

Nevertheless, it is apparent from the work that has been done thus far that the railway supply field is in a position such as it has never been in before to handle export trade on a permanent basis—a position, in fact, so strong as to fulfill the prophecies of the most ardent advocates of foreign trade. It must be borne in mind also that the United States is handicapped at present by the adverse exchange situation and by the difficulties of financing. On the other hand, it must also be remembered that thus far only one country other than ourselves, namely, Great Britain, has been able to engage in foreign business in railway supplies to any extent. The railway supply manufacturers of that country have been so busy supplying the demands of their own railways and those of India that with shortage of materials and labor difficulties they have not been able to compete with us on either price or delivery, even in some markets that have hitherto been exclusively British.

Nor have we as yet begun to receive orders from those countries—the former neutral countries of the world—from which it has been expected that we should receive the major portion of our export business. It seems safe to say under these circumstances that any improvement in the exchange situation, or the assistance to financing that may be permitted under the protection of the Edge bill, are going to see a continued and growing foreign trade in railway supplies.

There are those who observe that the catching up of the demands of our own railways will use up the capacity of our locomotive and car-building plants. The strong export organizations and forceful drives for foreign trade that are being made by some larger manufacturing companies should be a guarantee that the opportunities for export trade will not be let go by the board. Even if the railroads do find it possible to make up their back requirements in a very short time, the most optimistic do not believe that that will require all the capacity of the building shops of the country, which under proper conditions should aggregate over 7,000 locomotives and 300,000 to 350,000 freight cars yearly.



*The House of Representatives in Session.*

## Railroad Legislation Still in Uncertain Stage

Conferees Face Many Difficulties in Reconciling Esch and Cummins Bills But Action Is Expected by March 1

**L**ESS RAILROAD LEGISLATION has been enacted in 1919 than in any year for many years. State legislation has been kept to a minimum by the fact that the railroads have been operated by the federal government and because the Railroad Administration early in the year reached an understanding with the railroad brotherhoods by which they have applied to it rather than to state legislatures for what they wanted. In Congress the net result so far as actual enactment is concerned, as the Cummins and Esch bills are still in conference, has been one appropriation bill for \$750,000,000 when \$1,250,000,000 was needed, passed in June, when it should have been passed by March 4, and the bill to restore the rate-making powers of the Interstate Commerce Commission, which was vetoed by the President.

The legislation with which Congress has been struggling for a year is still unfinished.

While the President has greatly cleared the atmosphere by issuing the official proclamation relinquishing the railroads from federal control on March 1, and has finally put beyond argument the question of government or private operation, the terms and conditions under which the railroads are to be allowed to operate are still to be determined by the conferees of the Senate and the House, who are now at work in an effort to reconcile the conflicting provisions of the Cummins and the Esch bills, and by the votes of the two houses on their report. Therefore, in many respects, the future of railroad regulation is still in a stage

of almost as great uncertainty as has prevailed throughout the year.

To say this is not to say, however, that nothing has been accomplished by the laborious and often tedious work of the two Congressional committees that have been wrestling with the subject or by those who have been working with or on them, as the case may be, because the narrowing down of the many plans, schemes and suggestions to the two bills that have now been passed by the Senate and the House, itself represents an important accomplishment. Some very ambitious plans, which at least had sufficient backing to render them the subject of widespread discussion and controversy, have been definitely set aside.

First of these stands the McAdoo proposal for a five-year extension of federal control, carrying the prestige of the director general of railroads and the secretary of the treasury, as well as the statement that it had been approved by the President, which no longer has anything to show for itself except one of the large

variety of bills introduced in the House by Representative Sims and a record of hearings before the Senate committee on interstate commerce which was printed under the heading "Extension of Tenure of Government Control of Railroads" long after the plan had ceased to be considered by the committee.

Next came the Plumb plan which, offered with the accompaniment of threats of strikes, or even of revolution, and

**C**ONGRESSIONAL committees have been working hard on the railroad legislation but the task is still unfinished. The differences between the House and the Senate bills cause fear of great difficulty in reaching an agreement.

President's proclamation returning railroads as of March 1 clears atmosphere.

Question of Government ownership and operation put beyond stage of discussion. Five-year extension and Plumb plans met with little support.

Senate bill provides rate-making rule.



with the alleged support of nearly 2,000,000 strongly organized railroad employees, enjoyed a considerable period of pitiful as well as pitiless publicity, caused by its absurdity as well as its audacity, but which also got no further than the introduction of a bill by Mr. Sims, who is not so particular about what kind of bills he introduces as some other Congressmen, and a declaration by the committee that it was impossible. The bill was not even introduced in the Senate.

After the Plumb plan had been found to be a failure except for propaganda purposes, as a vehicle for mud-slinging against the railroads, and after even Samuel Gompers had refused to endorse it, the same organizations that had put it forward began to concentrate their activities on a proposal that the railways be retained by the government for two years. This plan is also embalmed in a bill or two by Mr. Sims and actually reached the stage of a vote in the Senate, where it was defeated 65 to 11 on a motion by Senator La Follette to substitute it for the Cummins bill. Incidentally the investigation by a committee of Congress demanded by the railroad labor leaders of the charges made by Mr. Plumb before the House committee, which boiled down to an assertion that about \$8,000,000 of railway capitalization is fictitious, has not appealed to members of Congress as being sufficiently worth while to expend the peoples' money on. A resolution providing for the investigation introduced by Representative Huddleston was referred to the committee on rules, which held two hearings on it of an hour or two each, attended by three members of the committee, and then did not even print the testimony.

The legislative program for the return of the railroads to private management, which now seems to be about to be fulfilled, dates from a message sent to Congress by the President at the opening of the session on December 2, 1918, when he declared that while he had no answer ready to the question of the permanent policy to be adopted towards the railroads and would welcome a Congressional solution of the problem, the one thing perfectly clear to him was that it would not be fair either to the public or to the owners of the railroads to leave the question unanswered and that it would presently become his duty to relinquish the roads, unless there should appear some clear prospect in the meantime of a legislative solution.

This declaration met with a prompt response in Congress and preparations were made for hearings before the interstate commerce committees to consider what ought to be done. The Railway Executives' Advisory Committee, now the Association of Railway Executives, held a meeting at New York on December 4 and adopted resolutions expressing the opinion that private operation should be fostered and preserved as a matter of national policy and that regulation should provide for the encouragement, protection and up-building of the railways as well as for the correction and check of any abuses.

The standing committee and the law committee were requested to consider and report back to the member roads proposals to accomplish results in accordance with the principles expressed and plans and methods to be favored in connection with the return of the railroad properties to their respective owners.

#### Five-Year Plan Shelved

Various organizations of shippers and others throughout the country also began to give consideration to the legislation considered necessary for the return of the roads and the Interstate Commerce Commission outlined a series of principles in its annual report to Congress, but the country was surprised on December 13 by the announcement of Mr. McAdoo's proposal for a five-year extension of federal control, in order to make possible a more complete test of government operation, which was accompanied by the statement

that the President was in accord with the plan. Mr. McAdoo's recommendation, contained in a letter addressed to the chairman of the Senate and House committees, was based on the ground that it would be impossible to secure legislation during the short session of Congress that would provide a permanent solution of the railroad problem and that it would be wholly impracticable to attempt to operate the roads under the provisions of the federal control act.

The five-year proposal aroused immediate opposition in Congress and generally throughout the country, but Mr. McAdoo was given a full hearing before the Senate committee and was followed by Mr. Hines, who supported his recommendations. The committee, however, showed no disposition to accept the idea of the former director general and proceeded with the hearing until near the close of the Congressional session with a view to considering plans for permanent legislation. It did not even report on the five-year proposal and the House committee finally gave up the idea of holding any hearings on it.

During the early months of the year it was rather generally assumed that in the absence of legislation the President might relinquish the railroads about June 30 and there was a very general demand for an extra session of Congress to consider the railroad question, which in part inspired the filibuster at the close of the regular session on March 4, which caused the failure of the appropriation bill asked by Mr. Hines. On May 19 at the opening of the special session the President sent a message to Congress saying that the railroads would be returned to their owners at the end of the calendar year. This put Congress upon notice that its legislation prescribing the conditions under which the railroads should be operated for the future should be completed by the end of the year and the two committees prepared to tackle the problem at once.

#### Senate Committee Hearings

The Senate committee, during its hearings in January and February had heard from practically all of the various interests involved in the railroad problem and had received a mass of testimony covering over 1,500 printed pages on various more or less comprehensive plans for dealing with the railroads. The chief of these were the general outline of principles proposed by the Association of Railway Executives; the comprehensive Warfield plan proposed by the National Association of Owners of Railroad Securities; the Interstate Commerce Commission plan for rounding out the act to regulate commerce without radical changes, which was later embodied in the Esch-Pomerene bill introduced in both houses of Congress; the Warburg plan, proposed by Paul M. Warburg and later included in the plan proposed by the National Transportation Conference; the Amster plan for unified operation of the railroads under a corporation controlled but not owned by the government, which was later represented by the Lenroot bill; and the Plumb plan, which, however, received little consideration until its later presentation before the House committee. There were also numerous other plans, most of which had for their purpose an improvement in the system of railroad regulation and the retention of some of the advantages resulting from unified operation as demonstrated by the Railroad Administration, but proposals for continued government operation received little support.

After the extensive hearings that had been held during January and February and with the extensive record taken by the Newlands committee in 1916 and 1917 before it, as well as its own voluminous record in connection with the federal control act in 1918, the Senate committee saw little to gain in holding further hearings and within a few days after its organization appointed a sub-committee to consider

the testimony already available with a view of framing a bill and presenting it to the full committee. The sub-committee consisted of Senators Cummins, Kellogg, Poindexter, Pomerene and Robinson, who now constitute the Senate conferees on the railroad bill. They held almost continuous sessions for many weeks, during which they consulted informally with the most prominent representatives of the various bodies interested in railroad matters, and on September 2 Chairman Cummins introduced S. 2906 as the result of the work of the sub-committee. This was referred to the full committee, which held sessions almost every day until October 23, when, having adopted many amendments, the new bill, which was passed on December 20, was introduced in the Senate and favorably reported by the committee.

### House Committee Hearings

The House committee on interstate and foreign commerce was behind the Senate committee to the extent that it had not held hearings during the last session, but its chairman, Mr. Esch, had given close study to the questions involved and on June 2 introduced the Esch-Pomerene bill which largely represented the views of the Interstate Commerce Commission. This was taken as the basis for the hearings which were begun on July 15 and continued almost daily until September 27, during which time 3,500 pages of testimony were given.

Commissioner E. E. Clark, chairman of the legislative committee of the Interstate Commerce Commission, spent a week before the committee explaining and supporting the provisions of the Esch-Pomerene bill, admitting that it was not intended to cover the whole ground but saying that the commission had not felt like expressing its views as to other plans in detail in advance of their presentation by their proponents. He was followed by numerous other witnesses, some of whom presented plans of their own, and discussed the plans proposed by others, but most of whom discussed or presented amendments to the Esch-Pomerene bill.

The railway executives presented their plan more in detail by putting it into the form of a bill, the Plumb plan was put into the form of a bill and introduced by Representative Sims, after which a week of the hearings was allowed to its proponents. The Warfield and Amster plans were also put in bill form as was a new compromise plan drafted by the National Transportation Conference called by the Railroad Committee of the Chamber of Commerce of the United States, which represented suggestions put forward by each of the principal proponents of separate plans of their own. The revised or new plans were at the same time filed with the Senate sub-committee which therefore had access to most of the new material developed before the House committee, although the Senate committee was less subjected to the influence of the large number of shippers' representatives and others who based their discussions mainly on the details of the Esch-Pomerene bill.

Following the hearings a sub-committee was appointed consisting of Representatives Esch, Barkley, Hamilton, Sims and Winslow, who are also the House conferees, who drafted a tentative bill which was never made public, after which amendments were adopted by the full committee and the Esch bill was introduced on November 8, followed by the report on November 10. Debate was begun on November 11 and on November 17 the bill was passed with some 50 amendments.

In the House committee opposition very speedily developed to the more radical changes in railroad regulating methods which had been proposed, such as the idea of reorganizing the railroads into larger systems proposed by Mr. Hines, the principle of a fixed minimum rate of return and a limitation of earnings included in the Warfield and National Trans-

portation Conference plans, and the proposal for federal incorporation and curtailment of the powers of the state authorities included in the plan of the railway executives as well as others. The committee did accept the proposal of the executives to the extent of inserting a provision for a general instruction to the Interstate Commerce Commission as to the elements to be considered in determining the reasonableness of rates but it was later stricken out in the House.

The Senate bill probably resembles the plan proposed by the National Transportation Conference more closely than any other, not because that plan was adopted by the committee, but because both the plan and the Senate bill were made up by selecting and revising provisions of various other plans. It contains many of the suggestions made by the executives, the general principle of the Warfield plan for a minimum percentage of return and a division of excess earnings, and also many of the detailed amendments to the interstate commerce act proposed by the Interstate Commerce Commission, while the plan for a reorganization of the railroads into 20 to 35 competing systems bears some resemblance to the ideas suggested by Mr. Hines, Daniel Willard and others, although it is probably more accurate to attribute it to Senator Cummins himself, who has been gradually crystallizing the plan for two or three years as a solution of the strong and weak road problem.

The Esch bill is still largely an embodiment of the suggestions of the Interstate Commerce Commission and seems to be more closely in accord with the views of shippers and others whose interest is largely in the questions of rates and details of service than the Senate bill, which is more reflective of the views of financiers, business men and others who have looked at the railroad problem as a whole.

### Government Ownership Is Not Even

#### Seriously Considered

Neither the Senate nor the House treated very seriously the new demands that had been made for government ownership. In the Senate committee report the subject was dismissed briefly with a statement that it would be attended with so many disadvantages—notably the increased cost of operation—that it must be discarded. The Plumb plan was not mentioned. The House committee's report said that in view of the "widespread demand among the people that federal control cease as soon as suitable legislation could be enacted" the committee had not recommended government ownership as a solution. The Plumb plan was declared "impossible."

### Conferees Face Difficulties

It has become plainly apparent that the conferees that have been meeting during the holiday recess are going to have great difficulty in reaching an agreement between the two bills and it is expected that their report will also arouse considerable debate in both houses before it is adopted. For this reason both railroad men and members of Congress expressed great satisfaction when the President not only fixed March 1 as the date for the return of the roads but in a way "cinched" the matter by issuing the formal proclamation so that it represents an act accomplished as far as the technical formality is concerned instead of a statement of intentions and therefore makes it much more difficult for Congress to try to give itself more time by postponing the date. While a majority of Congress wants to get the roads returned, it has become evident that labor intends to keep up the fight until the last ditch and some of the more susceptible Congressmen will stay put much more easily if the responsibility for action has already been taken by some one else.

The principal points on which the conferees are already encountering difficulties are the anti-strike provisions and the rate-making provisions of the Cummins bill, although the



House is also strongly opposed to federal incorporation and compulsory consolidation, or a transportation board. There are comparatively few provisions in the Esch bill to which the Senate has indicated opposition and if they could be accepted it would be possible to add the features of its bill to the Esch bill. On the other hand, a large part of the Esch bill is in the Cummins bill in a form differing only in comparatively unimportant details.

One of the most serious points of contention is involved in the labor provisions of the two bills and various compromises have been suggested, including the plan proposed by Senator McCormick of Illinois, patterned after the Canadian law, to prohibit strikes only for 60 days after a decision by the wage tribunal, which would be required to render a decision in 90 days. This was defeated in the Senate first by a tie vote of 30 to 30 and again by a vote of 33 to 30. Another compromise suggested provides for a tribunal including no partisan members.

The Esch bill contains no provision against strikes except the machinery for voluntary adjustment through boards of adjustment and commissions of labor disputes to which appeals may be taken, both composed of an equal number of representatives of the employees and of the managers, although some of the labor leaders are said to be suspicious of a paragraph which was left in the bill providing that "it shall be the duty of all carriers subject to this act and their agents, officers and employees to exert every reasonable effort and adopt every available and reasonable means to avoid interruption to the operation of a carrier," because another paragraph provides a penalty for violation of any of the provisions of the sections relating to labor disputes.

The Senate is expected, however, to object to the provision slipped into the Esch bill by the friends of the labor organizations confirming for the future the orders and decisions of the Railroad Administration relating to wages, hours and conditions of employment, and in view of the many severe criticisms of the Railroad Administration by members of Congress for having increased operating expenses it is difficult to see how they will explain voting for a provision confirming for the future the wage orders that have caused most of the increase in expenses after their attention has been called to the effect of this part of the bill.

The fact that the Senate voted by 46 to 30 to pass the Cummins bill does not necessarily mean that the majority of senators will fight to retain everything that is in it, because when they voted for the bill they were voting to send it to conference, as well as voting to give themselves a holiday recess, and were not voting to send a bill to the President for signature. The debate on the bill indicated a very apathetic attitude on the part of the senators generally, partly because of the great difference of opinion as to whether it is a pro-railroad or an anti-railroad bill. Many senators just at present are not anxious to be classed as either too friendly or too hostile toward the railroads.

While the discussion in Congress and before its committees throughout the year has been comparatively free from abuse of the railroads and has indicated a strong feeling on the part of many Congressmen that the roads have been too much restricted in the past and now need encouragement and help, this attitude has been assumed very gingerly by some who are not members of the committees and have not had the opportunity to fortify their opinions or get rid of their old prejudices by the aid of the detailed facts regarding the railroad situation which were presented by all classes of interests.

The extensive propaganda carried on against the bill by the labor leaders and the bitter attacks made against it by a few of the La Follette type on the ground that the bill constituted in effect a guaranty on the railroad capitalization, probably caused some confusion in the minds of many who

did not believe all of the violent claims that were made against the bill but were not sufficiently familiar with the facts to answer them.

It was amusing at times to note the eagerness on the part of many senators to lay aside the railroad bill, which they were afraid might be "loaded," and take up the sugar bill, because regardless of the economic questions involved it seemed to be much easier politics to hold down the price of sugar than to assist an increase in freight rates. Even Senator Cummins, who in a few years has changed his attitude from that of a severe critic of the railroads to a sincere desire to promote the public interest by giving the railroads a better chance to succeed, showed some hesitancy in assuming the leadership in the new role and rather reluctant in supporting a 5½ per cent return, although admitting that the great problem was to attract new capital. He did use his general understanding of the facts of the railroad situation to good advantage, however, in answering the attacks made against the bill.

The Cummins bill as reported by the full committee and as passed by the Senate with comparatively little change is regarded as a great improvement over the bill, S. 2906, drafted by the sub-committee, which proposed to confiscate all earnings above a "fair return" and which contained many defects.

The principal point of contention involved in the entire discussion of the proposed railroad legislation during the past year, with the possible exception of the method of dealing with labor controversies, has been the question of a rule of rate-making designed to insure an adequate income to the carriers by a more specific expression of policy than the old rule that rates shall be "just and reasonable." The House committee throughout its hearings seemed inclined to rely entirely on the Interstate Commerce Commission but after Commissioner Clark had indicated in a general way that the commission might welcome a legislative declaration of policy, the committee adopted the general rate-making rule which was stricken out in the House.

The rule adopted by the Senate committee and later by the Senate is an evolution from the idea of a minimum guaranty, such as was proposed by Mr. Hines and others. The guaranty idea was discarded as being too liberal to badly located or poorly managed railroads, and as tending to promote lack of enterprise and efficiency. Both the Warfield and the transportation conference plans proposed the principle of a legislative assurance of a definite percentage rate of return upon the aggregate value by districts and a limitation upon the excess, by various provisions for distribution. Both plans provided for a rate of 6 per cent. For a time a division of the excess earnings with labor was discussed and such a plan was included in the Senate sub-committee bill but was discarded because of the expressed opposition of labor to the idea of profit-sharing. The railroad executives through their association opposed a fixed percentage and also a limitation although some of them favored both provisions.

The rate-making provisions of the Cummins bill as passed are stated in Section 6, which under the ordinary interpretation of conference rules must be accepted or rejected as a whole or modified only in detail, as follows:

#### Rate-Making Section of Cummins Bill

Sec. 6. In dividing the country into districts and the carriers into rate-making groups the commission shall have in view the similarity of transportation and traffic conditions therein. Rates of transportation shall at all times be just and reasonable and sufficient to produce a reasonable return upon the aggregate value of the property in each rate group used or held for the service of transportation.

It being impracticable to establish a level of uniform rates and charges within competitive areas which will sustain sundry car-

riers indispensable to the communities served by them, without enabling more favorably situated carriers to receive revenue from such rates, negligibly as to each service, but in the aggregate substantially and unreasonably in excess of the aggregate over a fair return upon their property, unless regulated in the interest of the commerce of the United States as a whole, it is hereby provided that, subject to the exceptions and conditions of this act, no carrier subject to the provisions of this act shall be authorized to receive and retain for the transportation services rendered such proportion of the rates and charges collected by it as may yield in the aggregate more than a reasonable return upon the value of its property held for and used in the service of transportation, determined as herein provided. In changing or modifying rates, fares, charges and classifications from time to time in the manner provided in the act to regulate commerce, as amended, and in viewing them from the standpoint of their effect in producing revenue in any rate-making group as a whole, the commission shall initiate, modify, or adjust rates, fares, charges, and classifications, as nearly as may be, so that the railway carriers as a whole allocated to each district and subject to this act shall earn an aggregate annual net railway operating income equal, as nearly as may be, to  $5\frac{1}{2}$  per centum upon the aggregate value, as determined in accordance with the provisions hereof, of the railway property of such carriers in the district held for and used in the service of transportation: Provided, That in this respect the commission shall have reasonable latitude in order to adjust any particular rate, fare, or charge which may be found unreasonably high or unreasonably low. And it may, in its discretion, add to the basis above mentioned one-half of 1 per centum upon the aggregate value of said property, to make provision, in whole or in part, as the case may be, for what are commonly known as non-productive improvements, betterments, or equipment, which, according to the custom heretofore prevailing, have been charged to capital account, but which, to the extent that such allowance for such purpose shall be reflected in the net operating income of the several carriers, to be determined by the commission, shall not be capitalized or used in any way as a basis for increased rates, fares, or charges by those carriers whose net operating income for the year exceeds  $5\frac{1}{2}$  per centum upon the value of their respective properties.

In so changing or modifying rates, fares, charges and classifications from time to time in the manner provided in the act to regulate commerce, as amended, the commission shall take into consideration the interests of the public, the shippers, the wages of labor, the cost of maintenance and operation, including taxes, the requirements for additional capital in order to enable the carriers to adequately perform their duties to the public, and the conditions under which the same can be secured; and shall, so far as practicable, adjust rates, fares, charges and classifications that the net operating income of the several carriers shall bear the same relation to the value of their respective properties. For the purpose aforesaid, the commission shall from time to time determine the value of the property in each district and rate-making group so held for and used in the service of transportation, and lower or advance the rates, fares, or charges for transportation to produce, as nearly as may be, the net operating income above mentioned.

If, under the above provisions, any carrier shall receive a net railway operating income in any year of more than 6 per centum, after allowance, as aforesaid, by the commission for non-productive improvements, upon the said value of its property, one-half of such excess between 6 and 7 per centum shall be placed in a reserve fund established and maintained by such carrier, and the remaining one-half of such excess between 6 and 7 per centum shall, within the first four months of the succeeding year, be paid to and recoverable by the board for the purpose of establishing and maintaining a general railroad contingent fund, as hereinafter described. Of any such excess above 7 per centum, one-fourth thereof shall be placed in the reserve fund to be established and maintained by the carrier and the remaining three-fourths thereof shall, within the time aforesaid, be paid to and recoverable by the board as a part of said general railroad contingent fund as hereinafter described.

For the purpose of paying dividends or interest on its obligations, a carrier company may draw upon its said reserve fund whenever and to the extent that its annual net railway operating income shall fall below 6 per centum of the value of its property, determined as provided in this act.

In any year in which the said income of a carrier company which has accumulated and is maintaining a reserve fund equal to 5 per centum of the value of its property, determined as provided in this act, exceeds 6 per centum of such value, such carrier shall pay, within the first four months of the succeeding year, two-thirds of such excess to the board as a part of such general railroad contingent fund and the remaining one-third shall be retained by the carrier for such lawful use or disposition as it may determine: Provided, however, That any railroad corporation proposing to undertake any work of new construction may apply to the Interstate Commerce Commission for permission to retain for a period not to exceed ten years all or any part of its earnings from such new construction in excess of the amount heretofore in this section provided, for such disposition as it may care to make of the same; and the said commission may, in its discretion, grant such permission, conditioned, however, upon the completion of the work of construction within a period to be designated by the commission in its order granting such permission.

The aforesaid general railroad contingent fund and accretions thereof shall be administered by the board and invested in obligations of the United States or deposited in authorized depositories of the United States, subject to the rules promulgated from time to time by the Secretary of the Treasury relating to government deposits. And the said fund and all accretions thereof shall be employed or invested or expended by the board in furtherance of the public interest in railway transportation by carriers subject to the act to regulate commerce in avoiding congestions, interruptions or hindrances to the railway service of the United States by carriers subject to the act to regulate commerce, or in furthering the public service rendered by them, either by way of purchase, lease, or rental of transportation equipment and facilities to be used by such carriers wherever the public interest may require, or by way of loans to such carriers, upon such fair and reasonable terms and conditions, in either case, as the board may prescribe.

The commission shall prescribe rules and regulations for the determination and recovery of the excess earnings of the respective carriers subject to this act over and above the reasonable maximum provided for herein. To that end the commission may, in addition to the exercise of its general powers, require such security or prescribe such reasonable regulations and conditions as it may find necessary.

The provisions of this section shall not be construed as depriving shippers of their right to reparation in case of overcharges, unlawfully excessive or discriminatory rates, or rates excessive in their relation to other comparable rates, but no shipper shall be entitled to recover upon the sole ground that particular rates may reflect a proportion of excess earnings produced and to be recovered in the public interest under the provisions of this act: Provided, however, That in the year 1925 and in every fifth year thereafter the commission shall determine what, under the conditions then existing constitutes a fair return upon the value of such railway property, and it may increase or decrease the  $5\frac{1}{2}$  per centum basis herein prescribed, or the basis for the determination of excess income.

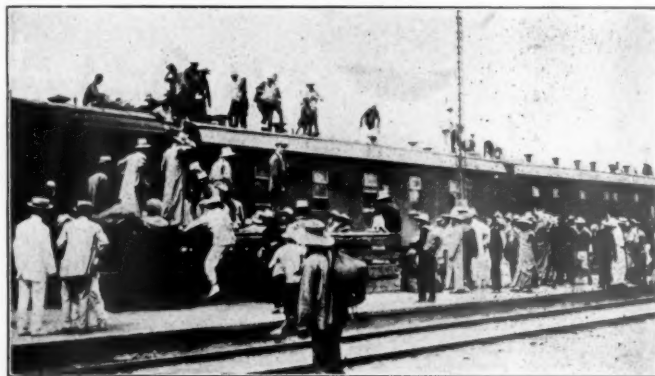
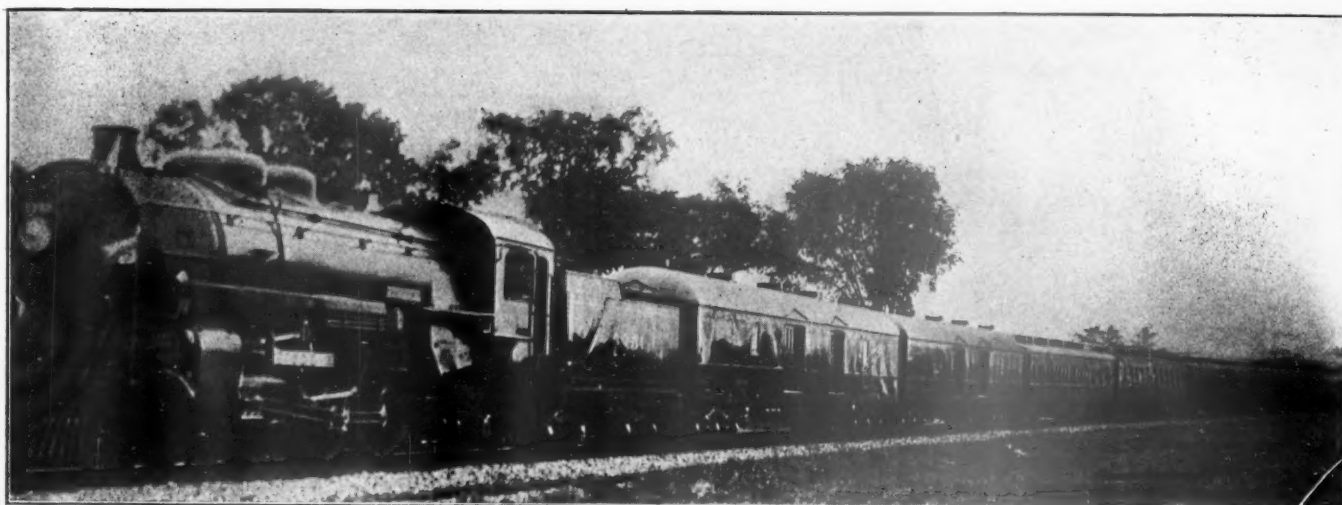


Photo by Courtesy of C. M. Winter.

With the Russian Railway Service Corps. Shortage of Cars at Harbin Compels Passengers to Ride on Roofs





*Train used by the Prince of Wales in his tour through Canada.*

## Canadian Railway Developments During 1919

With the Taking Over of the Grand Trunk, the Government  
Now Owns Nearly 22,000 Miles

By J. L. Payne

Comptroller of Statistics, Department of Railways and Canals, Ottawa, Canada

**T**HE YEAR 1919 will probably be remembered as the pivot, in the matter of time, on which turned the policy of railway nationalization in Canada. All that had preceded could scarcely be recognized as the assertion of a plan. Things had simply happened under the pressure of circumstances. Of this nature was the absorption of a number of small roads in the Maritime Provinces which, while independent units, were really feeders of the pioneer government railway, the Intercolonial. The monetary interests involved were relatively small, and the mileage was less than 500. This process occupied eight or ten years of time, and was not of sufficient importance to arouse controversy. It had been anticipated and did not materially alter the railway situation.

The first step toward the development of a really large state system was the retention of the National Transcontinental and its operation under Intercolonial management. This road was built by the government as the eastern section of the Grand Trunk Pacific, and was to be the public contribution toward Canada's second line across the continent; but it never passed out of government hands. The Grand Trunk Pacific felt unable to comply with the terms of acceptance, and, rather than have its 2,002 miles lying idle, it was, as has been said, put into operation under the Intercolonial. Having been constructed for the greater part of its length through an unsettled and comparatively unproductive territory, it was run at a loss.

Then came the taking over of the Canadian Northern,

consisting of nearly 10,000 miles of line. While popularly referred to as a third transcontinental system, it had not reached that position except in a technical sense. Its eastern terminus was at Montreal, thereby connecting it with Atlantic navigation in summer, and only to that extent did

it span the continent. It had a link lower down in the Province of Quebec, and another in Nova Scotia; but there was a hiatus of six or eight hundred miles between Montreal and an Atlantic port. In this uncompleted state as an ocean to ocean road it collapsed under the weight of its financial burdens and passed into the hands of government. This result came in the unavoidable sequence of events. The government was the guarantor of a very large volume of its bonds, and took possession rather than advance further millions to hold up a corporation at the end of its tether under war conditions.

Almost coincidental with the assumption of the Canadian Northern came the passing of the Grand Trunk Pacific, with its 1,682 miles, into receivership. The Minister of Rail-

ways became the official receiver for the same reason that had obtained in the Canadian Northern case. The government was the guarantor of the bonds. With the fate of the Grand Trunk Pacific went the Grand Trunk Pacific Branch Lines, a separate corporation operating more than a thousand miles of line in the West. The Dominion now had on its hands nearly 16,000 miles of railway and was confronted not only by very heavy and unlooked for responsibilities, but by the grave problem of recasting this huge

**T**HE TAKING OVER of the Grand Trunk by the Dominion in November was the most important development of the year.

Without bringing the question of railway nationalization before the Canadian people, the government now finds itself in control of more than fifty per cent of the railroad mileage of Canada.

Railroad construction has practically ceased.

Labor situation much the same as that in the United States.

mileage into a system which would do two things: First, reduce the annual deficit to the smallest possible proportions, and, second, to develop such operating conditions as would create the reasonable hope of making one hand wash the other in time. There was considerable paralleling of mileage in the western provinces, growing out of the rivalry for traffic among the Canadian Pacific, the Canadian Northern and the Grand Trunk Pacific, and occasion was thus created for constructive planning for the future.

It is well to get these facts clearly in mind, because they had everything to do with the salient event of 1919—the taking over of the Grand Trunk. The government had come into possession of two large railways in the west, and had for half a century owned and operated the chief road in the east. It also owned the National Transcontinental between Quebec and Winnipeg; but that road, primarily intended as a connecting link for the Grand Trunk Pacific between the prairie provinces and the Atlantic, was relatively unproductive. The populous province of Ontario, lying in between, was fairly divided between the Canadian Pacific and the Grand Trunk. It produced enormous traffic.

In this situation the course of policy was obvious. To give the state system a reasonable chance, possession of the traffic arteries of Ontario was imperative, and it so happened that an easy opportunity to meet the needs of the time came with the breaking down of the Grand Trunk Pacific and Grand Trunk Pacific Branch Lines. These roads had two guarantors—the Grand Trunk and the government. The former was the primary endorser. Without going into a mass of details, it must suffice to say that the Grand Trunk was insolvent by virtue of its responsibilities attaching to these subsidiaries. It was already top heavy on the side of capitalization, and in these times of financial stress had no means of swinging its burdens. The government had on several occasions been compelled to come to its rescue. Thus, while not bankrupt on its own account, it was really so by reason of its obligations.

The government in November took over the Grand Trunk, on terms with which readers of the *Railway Age* are familiar. The railway situation in Canada was by this act vitally changed. More than 50 per cent of the total mileage of the Dominion was now in state hands. While this did not represent nationalization, it will be recognized as a long stride in that direction. The facts with regard to mileage are as follows:

Intercolonial .....	1,592.35
Prince Edward Island.....	278.81
Transcontinental .....	2,002.92
Canadian Northern .....	9,479.17
Grand Trunk Pacific.....	1,794.07
G. T. P. Branch Lines.....	1,036.79
Grand Trunk in Canada.....	3,578.80
Grand Trunk in U. S.....	1,665.00
Lines in Maritime Provinces.....	485.00
Total .....	21,912.91

It is understood that this mileage is to be operated as a single system, which will make it very much the largest system on this continent. Other countries, notably Germany, India and Austria-Hungary, own and operate a larger mileage. In view of the duplication in the west, to which allusion has been made, there may be a reduction of the operating mileage as given above; but no definite announcement has been made in that regard. Be that as it may, it will be seen that the Government of Canada has a huge task on its hands, and the nature of that task will be better understood when two or three collateral facts are stated.

Every one of the roads in the new combination had a deficit in 1918. The total of these shortages cannot be accurately stated, owing to the absence of definite data in some instances as to fixed charges. This applies chiefly to the old government lines, the obligations of which appear in the general accounts of the Dominion and cannot be

identified. There are also those indirect deficits arising from the need for capital expenditures to bring certain lines up to a sound operating standard. The Canadian Northern, for example, is in that class. When the matter was under consideration in Parliament a few weeks ago various estimates of the annual loss which was likely to result for the next year were offered, and ran all the way from \$20,000,000 to \$50,000,000. Under these circumstances it would be imprudent to offer further surmise; but it was frankly admitted by the Minister of Railways that an adverse difference between income and outgo could not be avoided at the outset. Official statistics for 1918 show that in that year the immediate deficit for the combined roads was in excess of \$26,000,000. It would be possible within the compass of correct accounting to raise this figure considerably by the inclusion of capital charges attaching to the Intercolonial, Prince Edward Island and Transcontinental lines.

The capital liability involved in this large undertaking by the government cannot be calculated with absolute accuracy, owing to the situation with respect to the Grand Trunk. The common and preferred stocks, aggregating \$245,000,000, are to be made subject to arbitration. On the surface, however, it exceeds \$1,200,000,000. The operating revenues in 1918 for all the roads had a total of \$135,000,000, omitting the American end of the Grand Trunk, as to which the figures are not available. The total for all roads in the Dominion was \$332,000,000, which gives emphasis to the large place occupied by the Canadian Pacific among the units still outside of state control.

A novel feature of the situation as developed by the passing of the Grand Trunk is the control of mileage in the United States by the Canadian Government. That mileage, allowing for the Canadian Northern holdings across the boundary, will be above 1,900 miles. There was a time when such a fact would have been viewed with apprehension, as suggesting the possibilities of international complications; but that time has happily passed. The matter was not given prominence in the Parliamentary discussion which took place recently.

The attitude of public judgment toward the setting up of this large government railway system cannot be judged by anything that has yet happened. One prominent government journal opposed the acquirement of the Grand Trunk, while a somewhat hostile paper gave strong support. There would seem to be a general acceptance of the announcement that circumstances had compelled the action taken and thereby removed it from the realm of constructive controversy. There had long been a feeling that the administration of the Grand Trunk from England was unsatisfactory, and those who held that view are naturally disposed to approve the transfer to Canada. It is neither the disposition nor thought of the writer to offer a syllable of comment, nor to do more than set down the facts of the case in a judicial spirit.

The published statements of all the larger roads for the year ended June 30th last point to a substantial gain in gross earnings. In view of the increased rates which were in effect it cannot at this moment be said whether or not there was an actual growth in traffic. The indications are on the positive side. On the other hand, operating cost has shown persistent advances, and at this juncture nothing has occurred to warrant the hope of either stability or a decline. In this regard it will help to a clear appreciation of conditions in Canada to say they are essentially the same as those in the United States. The labor situation is identical, and, while strikes among railway men on this side of the line have neither occurred during the year nor are immediately threatened, it still remains a fact that the unions which govern on this side are international in jurisdiction.





*The Houses of Parliament Where the Transport Bill Was Considered and Passed.*

## English Railroads During the Year 1919

Ministry of Transport Created—Nine Days' Strike—  
Operating Economies Greatly Needed

By Robert E. Thayer  
European Editor of the *Railway Age*

LONDON, England, December 15, 1919.

ENGLAND ENTERS into the new year with its railways under the direct control of the government through the Ministry of Transport and with railway labor in a far more quiescent state than at the beginning of the year. It has strongly fought off nationalization for the present at least and has weathered a railway strike which has done much to clarify any bolshevik atmosphere which existed after the cessation of hostilities. The railway problems with which it is confronted at the beginning of the new year are the congestion of traffic, particularly at the ports; the making good of a deficit estimated at approximately \$225,000,000 and the final settlement with the railwaymen who precipitated the nine days' strike in last September.

### Ministry of Transport

The bill establishing the Ministry of Transport was introduced in the English Parliament on February 26, and after remaining there for five and a half months, during which 38 days were actually given to its discussion, was made a law on August 13. Sir Eric Geddes, who has had railroad experience in America, India and England in addition to having served as director-general of railways of the British forces in France, was made the first Minister of Transport.

In brief the purpose of this act is to bring under one de-

partment in the government the control of railways, light railways, tramways, canals and waterways, harbors and docks, roads and road traffic in order that transportation in its broadest sense may be coordinated for the welfare of

**T**HE BIG problem confronting the English railways is the demand for greater economy in operation, both in the coordinating of resources and in the use and maintenance of the properties.

The Ministry of Transport, by coordinating all modes of transportation, is expected to find a final solution of the problem.

Railway rates are to be increased to meet an anticipated heavy deficit, but greater possibilities lie in more efficient operation of the railway plant available.

the country. It is of a more or less temporary structure to remain in operation for two years for the purpose of studying and determining upon the permanent scheme of transport regulation for Great Britain. The power of the Minister of Transport is very broad, as he has complete control of operation, rate making, wages and compensation, improvements and extensions of all systems of transportation in the country. As a result of this bill it is natural that all competition between all methods of transport has ceased.

The organization of the Ministry of Transport consists of a Parliamentary Secretary who represents the Minister in Parliament, a chief mechanical engineer, a director-general of traffic, a director-general of civil engineering, a director-general of development, a secretary and solicitor combined in one office, a director-general of finance and statistics, a director-general of public safety and general purposes, a director-general of roads and a director-general of transport for Ireland.

At present the total staff employed by the Ministry of Transport totals 449 persons of whom 55 were previously

employed by railway companies, 14 by local authorities and 13 by engineering firms. No officers are shown as having been previously employed by canal companies, by road transport contractors, or motor car manufacturers. Out of this total 33 receive a salary of £1,000 (about \$5,000) or more per year, the salary of the Minister of Transport being £5,000 (\$25,000).

In addition to the above staff an advisory committee has been appointed consisting of 12 general managers from the railways and four representatives of the railwaymen's unions which will act in somewhat the same capacity as the Railway Executive Committee under which the railways were operated during the war but having less power. As far as actual operation of the roads is concerned, the Minister has stated that instead of a greatly increased control of the railways due to the formation of the Ministry of Transport, they will to a greater extent be conducted by their own management.

### Railway Labor

At the beginning of the year, railway labor was decidedly in a discontented frame of mind. During the war, bonuses, which at the signing of the Armistice had reached the amount of 33 shillings per week (about \$8), had been added to the men's weekly earnings to make up for the increased cost of living; the bonus was granted on a sliding scale basis and was given purely as a war measure with the expectation of a reduction as the cost of living decreased. At the cessation of the war a readjustment was made.

The locomotive drivers and firemen received as a final settlement standard wages sufficiently high to include the 33 shillings bonus. Later, attempts were made to adjust the wages of the other railways workers represented by the National Union of Railwaymen. These men had a lower wage scale and the government did not grant them a sufficiently high wage to include the 33 shilling war bonus; and it was this that led to the railway strike of September which was settled by a guarantee that existing wages would remain in effect to September, 1920, and that the subject of a standard wage would again be submitted to discussion. Negotiations with these men are still in progress. The eight-hour day for all members of the railway staff was put into operation on February 1, the railway shopmen obtaining a 47-hour week.

Since the strike negotiations between the railway unions and the government have led to an agreement whereby the railway workmen will participate to a certain extent in the control of the railways. An Advisory Committee, mentioned above, has been formed of which 12 members are general managers and four representatives of railways unions. In addition to this a Central Board has been established consisting of five railway managers and five representatives of the railway unions to discuss disputed matters concerning wages and conditions of service. If this board fails to agree on a question under discussion it is to submit the question to a National Wages Board consisting of four railway managers, four railway workers and four users of the railways, with an independent chairman to be appointed by the government. It has been agreed by the unions that no strike shall take place on account of a dispute until one month after the question in dispute has been referred to the National Wages Board.

During the war the railways suffered to a considerable extent by the loss of men, individual roads losing anywhere from 20 to 25 per cent of their staff. This interfered to a large extent with the work of the railways but with demobilization the railways have now a full complement of men.

### Traffic Congestion

England has suffered, particularly during the war, by a severe congestion of traffic all of which resolves back to the

war. About 600 locomotives, 30,000 freight cars and 1,600 passenger cars were sent to France during the war. In addition to this, because of the depleted forces, England has been unable properly to maintain the remaining equipment. Furthermore, due to the fact that railway freight rates were not increased, shipments which before the war were carried by coastal steamer service, were thrust on the railways because of the increase of freight charges by water. Another factor has also had a bearing on the situation. Due to the uncertainty of the market and the close margins upon which the merchants in Great Britain are working, consignments have been made in very small quantities and this has greatly reduced the car load.

The result of all this is that England is suffering from a lack of freight cars and until the old cars have been repaired and new cars built there is little prospect of much relief. It seems impossible, due to the very small freight cars used (they average from 10 to 12-tons capacity) to get the shippers to load the cars more nearly to their capacity. English railways have always made a feature of quick delivery in small quantities and it has been found practically impossible to force the shippers to fully load even these small cars to their full capacity.

The building of new cars has, of course, been greatly reduced. Most of this work was done in the railway companies shops. The experience of the Great Western Railway may be taken as typical. During the four years before the war that road built 10,000 freight cars, but during the five war years it was only able to build 1,500, and furthermore it was not able to keep up with the repairing of its old equipment.

The railway companies have hesitated to go into the open market for new cars on account of the high cost the outside builders are demanding. With the government in control of the railways and with the guaranteed return on the capital stock, and furthermore on account of the fact that there is still some feeling that the roads may ultimately be nationalized, the railways hesitate to make any excessive capital expenditures and it is only natural for them under these conditions to refrain from placing orders for cars at prices from 60 to 78 per cent higher than that which it would cost them to build the cars in their own shops.

As a solution to the car shortage problem, Sir Eric Geddes, Minister of Transport, has suggested recently that the government munition plants be put to work building freight cars; it is claimed that the Woolwich Arsenal, for instance, can turn out a car at £297 as against a price of £225 in railway shops and from £360 to £395 in car manufacturers' plants. All of these prices compare with the pre-war cost of £90 at railway shops.

The repairing and building of freight cars in both railway, government and industrial shops has been made more difficult and expensive on account of the eight-hour day, the new men that have had to be inducted into the service, and the lowering of the morale of the workmen which has been felt all over the world since the war. Added to this is the foundry molders' strike which has had its effect on all industries in Great Britain.

The effect of the manner in which the railways are taking over the coastal traffic is illustrated in the handling of coal from Wales. Before the war 61 per cent of the anthracite coal in Wales went to the seaboard with an average haul of 23 miles. Now this same quantity of anthracite is carried inland by rail with an average haul of 200 miles. The freight traffic through the Severn tunnel alone has increased 31 per cent. It is anticipated that the freight rates will be increased by January 15 to such an extent that the merchants will find it economical to use coastal shipping, and thus reduce the demands on the railways.

As an example of difficulty in increasing car loading the traffic on one railway may be mentioned which during one



month carried 2 per cent less tonnage but had an increase of 25 per cent in the number of consignments.

### Deficit in Net Income

The latest statement published by the Ministry of Transport shows that there is an anticipated deficit of \$225,000,000 expected for the year ending March 31, 1920. This has been caused by the greatly increased cost of labor and materials and the fact that freight rates have not been increased.

The English railroads feel particularly the increased cost of labor and materials, because before the war both these commodities were so extremely cheap. It has not been so necessary in the past to equip railway shops with labor saving machinery, because of the low cost of labor, as it has been in the United States. Furthermore all road construction and locomotive and passenger car building has involved more labor than that required for the same items in the United States.

Railwaymen now thoroughly appreciate the fact that more economical methods must be followed, and there is no department of the railways in which greater results can be obtained than in the mechanical department. As in the case of the freight cars, however, it is a question of how far the British railways will care to go in improving and modernizing their methods, which necessarily will involve heavy capital expenditures, because of the as yet undecided national policy to be followed in connection with the roads. The fact remains, however, that regardless of whether the roads are ultimately nationalized or whether they are returned to their private owners, vast improvements will have to be made if it is desired to decrease the present cost of operation.

Before the war the freight rates in England were high and any additional increase in these rates is not looked upon with favor by the shipping public. An increase, however, is necessary to put the roads on a paying basis, although there still remain great opportunities for reducing the cost of the operation.

### Electrification

Electrification has received considerable thought in England for some time, but because of the war, developments in this respect have been curtailed. The experience of a number of English roads such as the Lancashire & Yorkshire, the London, Brighton & South Coast and the London & South Western in the electrification of their suburban lines has shown such splendid results that other roads are now seeking to follow their footsteps.

During the past year the South Eastern & Chatham, the Great Eastern and the North Eastern have been giving this subject serious consideration.

The North Eastern has already decided to electrify 80 miles of its own line. The South Eastern & Chatham have plans well developed for the electrification of its suburban territory, with ultimate plans for electrified lines through to the Channel. The Great Eastern is finding the Liverpool Street terminus in London inadequate to handle its suburban traffic and is making a careful investigation as to the cost of electrifying its suburban lines. What eventually will be done remains to be seen, as it again depends upon the manner in which finances can be arranged.

### Possibilities for American

#### Railway Supply Manufacturers

American railway supply manufacturers seeking a market for their products in England should look upon the situation as one demanding an improvement in the efficiency of railway operation. The cost of labor and material has risen to such an extent that the railways, if they are to maintain

efficient service without the application of high rates must improve their operating methods. England has never had an Interstate Commerce Commission to drive down its rates and force the railways to economize, nor aggressive labor unions to demand labor saving and safety appliances, as have the railroads in the United States. Freight trains are operated with the chain coupling and without air brakes, and deficits are made up by an increase in rates. Lack of statistics has made it almost impossible properly to diagnose the railway problem, but it is anticipated that under the Ministry of Transport these statistics will be forthcoming; they should give strong indications as to where savings can be made and with the rapid growth in the strength of the railwaymen's unions, undoubtedly greater demands will be made for safety in operation.

Labor was so cheap in England before the war and is so high now that steps must be taken for more economical and efficient operation. Perhaps the greatest possibility for American railway supply manufacturers is that in the railway shops of Great Britain. Modern machinery, labor saving devices and more efficient operation is greatly needed. Mechanical department officers have acknowledged that with the greatly increased cost of labor, the eight-hour day and the increased cost of materials, drastic steps must be taken in order to economically operate their works. The question is, however, as to just how and when such improvements will be made, due principally to the fact that the railways now being under the control of the government and having a guaranteed return do not have the incentive to initiate heavy capital expenditures for the improvement of methods and for the reduction in the cost of operation.



From the Albany Knickerbocker Press

Help Yourselves!

## General News Department

The American Association of Engineers announces that it will conduct its second annual conference of professional engineers in railroad service in Chicago, on March 15, 1920.

Fire did damage to the amount of \$25,000 on the building containing the yardmaster's and local freight agent's offices of the New York Central at Weehawken, N. J., on December 21.

Arrests for smuggling liquor reported from London, Ont., December 21, involved 11 colored cooks, waiters and porters on a Grand Trunk express train, westbound. Officers boarding the train captured 33 bottles of whiskey and other liquors.

Immediate foreclosure against the Chicago, Peoria & St. Louis, now in receivership, is demanded by holders of the general and refunding mortgage bonds. The demand is made by a committee representing bond holders, in a letter to the Bankers' Trust Company, Chicago, trustee under the mortgage.

### Extension of Annual Passes

Supplement 59 to Circular 20 of the Northwestern regional director extends all railroad, Pullman and steamship annual or time passes expiring December 31, 1919, to February 29, 1920.

An order has been issued notifying roads to proceed to issue, in the usual manner, passes for use after February 29. General managers are authorized to use their clerical forces for this purpose. The forms of passes should be approved by officers of the corporation.

### "Merry Christmas!"

The Alabama, Tennessee & Northern is not a large road—186 miles, 21 locomotives, and 304 cars—but the corporation made itself prominent on Christmas Day by sending gifts of money to numerous officers and employees. One of the beneficiaries of this manifestation of the Christmas spirit has shown us a letter from John T. Cochrane, president and general manager, which says, in part:

"As a remembrance and in appreciation of your services and loyalty to our corporation, I take pleasure in handing you herewith a Christmas check.

"We are sending these checks to heads of departments, agents and office employees working on monthly pay and whose hours and conditions of service differ from others.

"Please accept this with the best wishes of our corporation, its directors and officers for a HAPPY CHRISTMAS, and my personal wish that your relations with the other officers of the corporation and myself will continue to be as pleasant and mutually satisfactory as I feel they are today."

Mr. Cochrane's act is so unusual that it has been called unique. Whether it is proper really to call it so we are unable to say, for it is about half a century since the last incident of the kind occurred, so far as memory serves.

### A Surplus of Coal

Between 10,000 and 12,000 carloads of coal are standing on sidings and in yards in the Central Western region and unless assistance comes from some unexpected quarter the railroads probably will have to burn the coal themselves. The accumulation, about 600,000 tons, is an aftermath of the recent coal strike. Pursuant to the appeals of consumers suffering from the shortage, the Fuel Administration sent a great quantity of coal into this region from the Pennsylvania and Virginia fields. The shipments reached their destination at about the time a settlement of the strike appeared likely

and as a result the coal, which was to retail for something more than \$9 a ton, was left in the hands of the railroads. The total retail value is about \$5,500,000.

### Railroad Labor Leaders Object to Return of Roads and Anti-Strike Legislation

Officers of the 14 principal railroad labor organizations, including the four train service brotherhoods, at a conference with Samuel Gompers of the American Federation of Labor at Washington on December 29, adopted a declaration of principles expressing their dissatisfaction with the President's action in relinquishing control of the railroads as of March 1 and also their opposition to the anti-strike provisions of the Cummins bill, but saying nothing regarding the wage demands which most of them have pending before the Railroad Administration but which have been held in abeyance to give the government an opportunity to try to reduce the cost of living. It has been assumed that an effort would be made to press the wage demands before the railroads are returned, but the labor leaders recently have been expressing greater concern over the proposed anti-strike law, which would take away much of their power to force wage increases by threatening to strike. The representatives of the shop employees have had one conference with Director General Hines on their demands and are expected to resume the discussion at an early date. The declaration adopted at the conference with Mr. Gompers says:

"That is is the sense of the conference that the control of the railroads should be exercised by the government of the United States for a period of not less than two years, that a proper test may be made as to government control.

"That such test has not been given a fair opportunity during the war times or since.

"This conference is opposed to legislation making strikes of workers unlawful. It is the sense of this conference that penalty clauses in pending legislation on railroads against workers ceasing their employment should be eliminated.

"That the conference favors the enactment of beneficial features of the bills which tend to establish better relations between employees and carriers.

"That the beneficial clauses should be extended to the sleeping car and Pullman Company employees."

During the meeting Mr. Gompers was called out for a long conference with Daniel Willard, president of the Baltimore & Ohio.

### Canadian Board of Adjustment

The Canadian Railway Board of Adjustment No. 1 recently issued decisions in two cases between the Toronto, Hamilton & Buffalo and the Brotherhood of Railroad Trainmen and between the railway company and the Order of Railway Conductors and the Brotherhood of Railroad Trainmen. The first decision was given in favor of the company and settled a controversy arising from the fact that a number of yard engines have been operated on the lines of this road by crews consisting of a foreman and one helper. The employees contended that this violated safe practice and that a safety rule should be incorporated in the trainmen's schedule stating that yard crews shall consist of not less than a foreman and two helpers. The company contended that the basis of the present assignment affords both safe and efficient operation and this stand was upheld by the Board. The second case involved a controversy over the application of Article 4 of Supplement 16 to General Order 27 of the United States Railroad Administration. The employees contended that regular passenger trainmen could not be used in freight service to make up monthly guarantees, whereas the



company contended that regularly assigned passenger men could be used in any class of service in order to make up their guarantees. The Board sustained the contention of the employees and decided that regularly assigned passenger men may not be used in freight service to make up monthly passenger guarantees.

### Railway Business Association Dinner

The Railway Business Association, which for the last two years has held its annual meeting at Chicago, will resume this year its former practice of convening in New York. The meeting will be held at the Waldorf-Astoria Hotel on March 31—business session 11 a. m., luncheon 12:30 p. m., reports of convention committees and election of officers 1:30 p. m., dinner 7 p. m. The speaking program is to be announced later.

### Meetings and Conventions

The following list gives names of secretaries, dates of next or regular meetings and places of meetings:

- AIR BRAKE ASSOCIATION.—F. M. Nellis, 165 Broadway, New York City. Next convention, May 5-7, 1920, Chicago.
- AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—F. A. Pontious, Supervisor of Demurrage and Storage, C. & N. W. Ry., Chicago.
- AMERICAN ASSOCIATION OF DINING CAR SUPERINTENDENTS.—S. W. Derr, C. R. R. of N. J., Philadelphia, Pa.
- AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, Illinois Central, Chicago. Next annual meeting, June, 1920.
- AMERICAN ASSOCIATION OF GENERAL BAGGAGE AGENTS.—E. R. Reynolds, C. G. W. R. R., Chicago.
- AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICERS.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York.
- AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—J. Rothschild, Union Station, St. Louis, Mo.
- AMERICAN ELECTRIC RAILWAY ASSOCIATION.—E. B. Burritt, 8 W. 40th St., New York.
- AMERICAN ELECTRIC RAILWAY MANUFACTURERS' ASSOCIATION.—C. F. J. Dell, 50 E. 42nd St., New York.
- AMERICAN RAILROAD MASTER TINNERS', COPPERSMITHS' AND PIPE FITTERS' ASSOCIATION.—Otto E. Schlinck, 185 W. 5th St., Peru, Ind.
- AMERICAN RAILROAD ASSOCIATION.—J. E. Fairbanks, 75 Church St., New York:
- Section I, Operating (including former activities of Association of Railway Telegraph Superintendents). W. J. Frippe (chairman), N. Y. C. R. R., New York, N. Y.
- Telegraph and Telephone Division.—M. H. Clapp, U. S. R. R. A., Washington, D. C.
- Section II, Engineering.—E. H. Fritch, 431 South Dearborn St., Chicago.
- Signal Division.—H. S. Balliet, 75 Church St., New York.
- Section III, Mechanical (including former activities of Master Car Builders' and Master Mechanics' Association).—V. R. Hawthorne, 431 South Dearborn St., Chicago. Next convention, June 9-16, 1920, Atlantic City, N. J.
- Section IV, Traffic (including former activities of Freight Claim Association).—Robert C. Wright (chairman), Assistant Director, Division of Traffic, U. S. R. R. A., Washington, D. C.
- Section V, Transportation (including former activities of Association of Transportation and Car Accounting Officials).—E. J. Pearson (chairman), Federal Manager, N. Y., N. H. & H. R. R., New Haven, Conn.
- Section VI, Purchases and Stores (including former activities of Railway Storekeepers' Association). J. P. Murphy, N. Y. C. R. R., Collinwood, Ohio.
- Section VII, Freight Claims (including former activities of the Freight Claim Association).—H. C. Pribble (chairman), A. T. & St. Fe, Topeka, Kan.
- AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W. Ry., 319 N. Waller Ave., Austin Station, Chicago. Next convention October 19-21, 1920, Atlanta, Ga.
- AMERICAN RAILWAY ENGINEERING ASSOCIATION.—(Works in co-operation with the American Railroad Association, Section II.) E. H. Fritch, 431 South Dearborn St., Chicago. Next convention, March 16-18, 1920, Chicago.
- AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—(See American Railroad Association, Section III, Mechanical.)
- AMERICAN RAILWAY PERISHABLE FREIGHT ASSOCIATION.—E. F. McPike, 135 E. 11th Place, Chicago. Regular meetings, 2d Wednesday in March and September.
- AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—R. D. Fletcher, 1145 East Marquette Road, Chicago.
- AMERICAN SOCIETY FOR TESTING MATERIALS.—C. L. Warwick, University of Pennsylvania, Philadelphia, Pa.
- AMERICAN SOCIETY OF CIVIL ENGINEERS.—Charles W. Hunt, Engineering Societies Building, 33 W. 39th St., New York. Regular meetings, 1st and 3d Wednesday in month, except July and August, 33 W. 39th St., New York.
- AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York.
- AMERICAN TRAIN DESPATCHERS' ASSOCIATION.—D. L. Darling, Northern Pacific Ry., Spokane, Wash.
- AMERICAN WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, B. & O. Mt. Royal Sta., Baltimore, Md. Next annual meeting, February 10-12, 1920, Hotel Sherman, Chicago.
- ASSOCIATION OF RAILWAY CLAIM AGENTS.—Willis H. Failing, C. R. R. of N. J., Jersey City, N. J. Next meeting, May, 1920, Atlantic City, N. J.
- ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago.
- ASSOCIATION OF RAILWAY EXECUTIVES.—Thomas De Witt Cuyler (chairman), 61 Broadway, New York, N. Y.
- ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—(See American Railroad Association, Section I, Operating.)
- ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—(See American Railroad Association, Section V, Transportation.)
- BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—M. J. Trees, Chicago Bridge & Iron Works, Chicago.
- CANADIAN RAILWAY CLUB.—W. A. Booth, 131 Charron St., Montreal, Que.
- CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 626 North Pine Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August, New Morrison Hotel, Chicago.
- CAR FOREMEN'S ASSOCIATION OF ST. LOUIS.—Thomas B. Koeneke, Federal Reserve Bank Bldg., St. Louis, Mo.
- CENTRAL RAILWAY CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 2d Thursday in November, and 2d Friday in January, March, May and September, Hotel Statler, Buffalo, N. Y.
- CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S ASSOCIATION.—J. C. Keene, General Car Inspector, Wabash R. R., Decatur, Ill.
- CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S SUPPLY MEN'S ASSOCIATION.—D. B. Wright, Lehon Company, 45th and Oakley Sts., Chicago.
- EASTERN RAILROAD ASSOCIATION.—D. G. Stuart, Washington, D. C.
- FREIGHT CLAIM ASSOCIATION (See American Railroad Association, Section IV, Traffic).
- GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—A. M. Hunter, 321 Grand Central Sta., Chicago. Regular meetings, Wednesday preceding 3rd Friday in month, Room 856, Insurance Exchange Bldg., Chicago.
- INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, B. & O., Lima, Ohio.
- INTERNATIONAL RAILWAY FUEL ASSOCIATION.—J. G. Crawford, 702 E. 51st St., Chicago. Next annual meeting, May, 1920, Hotel Sherman, Chicago.
- INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 1061 W. Wabash Ave., Winona, Minn.
- MAINTENANCE OF WAY MASTER PAINTERS' ASSOCIATION.—E. E. Martin, Union Pacific R. R., Room No. 19, Union Pacific Building, Kansas City, Mo. Next convention, October 5-7, 1920, Detroit, Mich.
- MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York. Next annual meeting, May 25-28, Curtis Hotel, Minneapolis, Minn.
- MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—A. P. Dane, B. & M., Reading, Mass.
- MASTER CAR BUILDERS' ASSOCIATION.—(See American Railroad Association, Section III, Mechanical.)
- NATIONAL ASSOCIATION OF RAILWAY AND UTILITIES COMMISSIONERS.—James B. Walker, 49 Lafayette St., New York. Next convention, November, 1920, Washington, D. C.
- NATIONAL FOREIGN TRADE COUNCIL.—O. K. Davis, 1 Hanover Square, New York. Next convention, May 12-15, 1920, San Francisco.
- NATIONAL RAILWAY APPLIANCE ASSOCIATION.—C. W. Kelly, Kelly-Derby Co., Peoples Gas Bldg., Chicago.
- NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, excepting months of June, July, August and September.
- NEW YORK RAILROAD CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meeting 3d Friday in month, except June, July and August, 29 W. 39th St., New York.
- NIAGARA FRONTIER CAR MEN'S ASSOCIATION.—George A. J. Hochgrebe, 623 Brisbane Bldg., Buffalo, N. Y. Regular meetings, 3d Tuesday in each month, Tenjost Hall, Buffalo, N. Y.
- PACIFIC RAILWAY CLUB.—W. S. Wollner, 64 Pine St., San Francisco, Cal. Regular meeting 2d Thursday in month, alternately in San Francisco and Oakland.
- RAILWAY ACCOUNTING OFFICERS' ASSOCIATION.—E. R. Woodson, 1116 Woodward Bldg., Washington, D. C. Next convention, May 12, Atlantic City, N. J.
- RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 30 Church St., New York.
- RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, 515 Grandview Ave., Pittsburgh, Pa. Regular meetings, 4th Thursday in month except June, July and August, Americus Club House, Pittsburgh, Pa.
- RAILWAY DEVELOPMENT ASSOCIATION.—D. C. Welty, Missouri Pacific R. R., Little Rock, Ark.
- RAILWAY ELECTRIC SUPPLY MANUFACTURERS' ASSOCIATION.—J. Scribner, General Electric Co., Chicago. Annual meeting with Association of Railway Electrical Engineers.
- RAILWAY EQUIPMENT MANUFACTURERS' ASSOCIATION.—D. L. Eubank, Galena Signal Oil Company, Richmond, Va.
- RAILWAY FIRE PROTECTION ASSOCIATION.—R. R. Hackett.
- RAILWAY REAL ESTATE ASSOCIATION.—R. H. Morrison, C. & O., Richmond, Va.
- RAILWAY SIGNAL ASSOCIATION.—(See American Railroad Association, Section II, Signal Division.)
- RAILWAY STOREKEEPERS' ASSOCIATION.—(See American Railroad Association, Section VI, Purchases and Stores.)
- RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 1841 Oliver Bldg., Pittsburgh, Pa. Next convention, June 9-16, Atlantic City, N. J.
- RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, Waterbury Battery Co., 30 Church St., New York.
- ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—P. J. McAndrews, C. & N. W. Ry., Sterling, Ill.
- ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August.
- SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, West Nyack, Rockland County, New York.
- SOCIETY OF RAILWAY FINANCIAL OFFICERS.—L. W. Cox, 1217 Commercial Trust Bldg., Philadelphia, Pa.
- SOUTHERN AND SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, P. O. Box 1205, Atlanta, Ga. Regular meetings, 3d Thursday in January, March, May, July, September and November, Piedmont Hotel, Atlanta.
- SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, Western Ry. of Ala., Atlanta, Ga.
- SUPPLY ASSOCIATION OF AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—C. N. Thulin, Duff Manufacturing Company, 935 Peoples Gas Bldg., Chicago.
- TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y.
- TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. P. Finan, A. T. & S. F. Ry., Needles, Cal.
- TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. R. R., Cleveland, O.
- WESTERN ASSOCIATION OF SHORT LINE RAILROADS.—Clarence M. Oddie, Mills Bldg., San Francisco.
- WESTERN RAILWAY CLUB.—J. M. Byrne, 916 W. 78th St., Chicago. Regular meetings, 3d Monday in month, except June, July and August.
- WESTERN SOCIETY OF ENGINEERS.—Edgar S. Nethercut, 1735 Monadnock Block, Chicago. Regular meetings, 1st Monday in month, except July and August.

## Traffic News

The Southwestern regional director, by Supplement 3 to Order 189, calls attention to the fact that there are still many instances where freight is accepted and loaded in violation of embargoes and that cars are allowed to accumulate before placing embargoes. The first practice inevitably results in cars being delayed and the second results in many cars being held motionless under load for considerable periods. Embargoes must be placed early enough to admit of cars already in transit being moved to destination and unloaded.

According to a report on overseas traffic for the week ended December 17, 1919, made to the director general, 6,895 cars of commercial export freight were received at North Atlantic ports during this period, as compared with 1,352 cars for the same week of 1918. This shows an increase of 5,507 cars or 407 per cent for December 17, 1919, as against the corresponding period last year. Deliveries to ship covering the same period increased 5,529 cars or 470 per cent. At South Atlantic and Gulf ports as of December 14 there were 13,288 cars of export freight on hand, as against 13,228 cars on December 7, 1919, an increase of 60 cars. On December 17, 1919, there were 11,907,146 bushels of grain stored in elevators at North Atlantic ports. There were received during the week 3,043,241 bushels, while 2,919,946 bushels were cleared. The total amount of grain in elevators as of December 17 represents 60.5 per cent of the total elevator capacity of these ports. At South Atlantic and Gulf ports on December 17, 1919, there were 6,043,758 bushels of grain stored in elevators, representing 82 per cent of the total elevator capacity.

### Coal Production

Bituminous coal production during the week ended December 20 was 86.4 per cent of normal, according to the Geological Survey bulletin, as compared with 48 per cent the week before. The total output, including lignite and coal coked, is estimated at 10,431,000 net tons. The average during the four weeks immediately preceding the strike was 12,089,000 tons. Unless later returns cause a downward revision of the estimates, the curve of 1919 production has again crossed that of 1918.

### Railway Passes in Canada

The Board of Railway Commissioners for Canada has issued in General Order 274 an answer to the application of the Canadian Railway War Board, on behalf of the railway companies for an order regulating the issuance of free transportation under Section 345 of the Railway Act. The order permits the issuance of free tickets for the following:

Department of Immigration of Dominion of Canada: For such representatives of the Department as may be required by the Minister or Deputy Minister.

Departments of Immigration and Customs of the United States: For such representatives of the Departments as may be required by the Commissioner or Deputy Commissioner of Immigration or Collector or Deputy Collector of Customs in charge of the District.

Fire rangers within their respective districts, employed or authorized by Provincial governments.

Families of former and deceased employees of railways. Former employees of transportation companies and their families.

Deputy Ministers of Departments of the Federal Government, and those having the rank of Deputy Ministers.

With the order there is a memorandum outlining briefly the reasons for the Board's contention that the whole purport of Section 345 of the Railway Act was to give the railway companies, within certain limits, the right to carry traffic at free or reduced rates and to such classes of persons and in some cases individuals as the companies may decide upon,

subject in certain cases to the approval and the permission of the Board of Railway Commissioners.

### Intensified Efficiency

A motor manufacturer tells how L. B. Hawkins, of Moneta, Cal., who operates a fleet of eight Mack motor trucks, did a notable "stunt" recently when he responded to an urgent call from a seed merchant near Los Angeles, who wanted to ship 15 tons of seed in a particular rush to a town 225 miles away, and no freight car was available. Hawkins, with two trucks, one carrying ten tons and the other five, started out for Calexico the next morning. At night a stop was made and the trip resumed at dawn. Calexico was reached in thirty hours. A return load of 15 tons of dried milk was secured at El Centro, 10 miles from Calexico, and taken to San Diego, 100 miles. There a 15-ton lot of fish was taken and delivered in Los Angeles, 130 miles farther. Reaching home at Moneta at midnight, one of the trucks, with a trailer, delivered 17½ tons of tomatoes by next morning to a cannery 25 miles away. At a town nearby, a lot of well casing, 7½ tons, was taken on and delivered that night at Elsinore, 100 miles away over the mountains.—Moral: solicit return loads in a persistent manner.

### City Traffic Bureaus

Thomas Purse, secretary of the Board of Trade of Savannah, Ga., following an inquiry made by him concerning the means of support of traffic bureaus in various cities, publishes a list of 23 cities, in which he summarizes the information which he has obtained. Savannah formerly enjoyed the benefits of a bureau sustained wholly by the city treasury, but this has now been abolished. Mr. Purse finds only 3 cities in which a bureau of this kind has municipal support: Charleston, S. C.; Columbia, S. C.; and Jacksonville, Fla.

Following are the names of the cities which replied to the inquiry, the sum named against some of the cities being the estimated cost of maintenance of the bureau for one year. The bureaus in most or all of these cities are supported by the Chamber of Commerce or a body performing the functions of such a chamber.

Atlanta, Ga. ....	\$15,000	Galveston, Tex. ....	14,000
Baltimore, Md. ....	.....	Jacksonville, Fla. (city appropriates \$1,200; balance contributed by public subscription).	.....
Birmingham, Ala. ....	25,000	Memphis, Tenn. ....	15,000
Boston, Mass. ....	25,000	Nashville, Tenn. ....	15,000
Charleston, S. C., \$8,000 (contribution from the city, \$4,000).	.....	New Orleans, La. ....	29,500
Chattanooga, Tenn. ....	.....	Philadelphia, Pa. ....	15,000
Chicago, Ill. ....	25,000	Providence, R. I. ....	.....
Cincinnati, Ohio ....	15,000	Richmond, Va. ....	.....
Cleveland, Ohio ....	15,000	Savannah, Ga. ....	.....
Columbia, S. C. (city appropriates \$3,000; chamber of commerce provides the remainder; total not given).	.....	Tampa, Fla. ....	.....
Detroit, Mich. ....	15,000	Trenton, N. J. ....	.....
		Wilmington, N. C. ....	.....

### Smith Fifteenth Section Amendment Expires

The railroads are no longer required to obtain the approval of the Interstate Commerce Commission before filing a tariff containing an increased rate, but they may file them with the usual 30 days' notice, after which they become effective unless suspended by the commission. The amendment to the fifteenth section of the commerce act, adopted by Congress in 1917 at the suggestion of Senator Hoke Smith of Georgia, for the purpose of making it more difficult for the carriers to increase rates, expires by its terms on January 1. Senator Smith recently introduced a similar provision without the time limit, as an amendment to the Cummins bill, which was adopted and therefore becomes one of the points to be considered by the conferees, as the Esch bill contains no such provision. The effect of the amendment has been to reduce greatly the number of suspension proceedings because shippers have been given an opportunity to protest against a tariff before it is filed. In unimportant cases the commission issues a pro forma fifteenth section approval order.

The Ohio State Industrial Traffic League has instructed its officers to convey to Chairman Esch and Chairman Cummins the League's wish that this provision be perpetuated.



## Commission and Court News

### Interstate Commerce Commission

Apparently the Interstate Commerce Commission is still proceeding on the assumption that the railroads are to be returned at the end of the year, for it has been issuing this week special permission notices for the filing of freight rates on one day's notice but on condition that the approval is void if the tariff is not filed with the commission by December 31.

#### Report in Memphis-Southwestern Case

The Interstate Commerce Commission has issued its report on its Memphis-Southwestern investigation, in which a maximum distance scale of class rates is prescribed for distances not in excess of 350 miles between points in Arkansas, Oklahoma and southern Missouri. Existing class rates between Memphis, Tenn., and all points on class A railroads in Arkansas are found unreasonable and unduly prejudicial to Memphis to the extent that they exceed by more than reasonable bridge tolls the corresponding class rates contemporaneously applicable for like distances to intrastate traffic in Arkansas. Reasonable bridge tolls are prescribed. Existing class rates from Memphis to points in southern Missouri as defined in the report are declared unreasonable and unduly prejudicial to Memphis to the extent that they exceed by more than reasonable bridge tolls the corresponding class rates contemporaneously in effect from St. Louis, Mo., to the same points for like distances.

Class rates from Memphis to points in Arkansas are held unduly prejudicial to Memphis to the extent that they exceed by more than reasonable bridge tolls the corresponding rates for like distances from St. Louis. Rates and practices of the Missouri Pacific with respect to the concentration of Arkansas cotton at Memphis were not shown to be unduly prejudicial or otherwise unlawful, but the commission holds that the rates for back hauls on cotton to compress points should be published on a uniform basis.

Other points in the decision are:

Practice of the Missouri Pacific and the Cotton Belt with respect to charges for the delivery of cotton at Memphis and at East St. Louis, Ill., subjects Memphis to undue disadvantage.

Class rates from St. Louis to points in southern Arkansas are unreasonable and unduly prejudicial to those points and unduly preferential to Pine Bluff and Little Rock.

Class rates from Natchez, Miss., to certain points on class A railroads in Arkansas are unreasonable and unduly prejudicial to Natchez and unduly preferential of Memphis and Little Rock.

Class rates from Monroe and Shreveport, La., to points on class A railroads in southern Arkansas are unreasonable, unduly prejudicial to Monroe and Shreveport and unduly preferential of competing points in Arkansas to the extent that they exceed for like distances the corresponding class rates applicable to intrastate traffic in Arkansas.

Allegation that class-rates from groups of origin in western trunk line territory to Fort Smith, Ark., are unduly prejudicial to that point and unduly preferential of points in eastern Oklahoma, not sustained.

Class and commodity rates from certain territories in the southeast to points in Arkansas are unduly prejudicial to Arkansas and unduly preferential of certain points in Oklahoma.

Reasonable maximum class rates approved between Memphis, Tenn., and Kansas City, Mo.

Fourth section applications by which the carriers parties thereto seek authority to continue lower class and commodity rates to and from competitive points along the Mississippi river, St. Louis and south, than the rates to and

from intermediate points, denied. Other fourth section applications considered and appropriate findings made.

Reasonable class rates established from New Orleans, La., to points in Arkansas, Oklahoma and Missouri river cities.

Class and commodity rates from New Orleans to interior points in eastern Kansas are, under present conditions, unduly prejudicial to those points and unduly preferential of Kansas City. A proper alignment suggested.

Differentials over Kansas City approved for constructing class rates to Omaha from New Orleans. Differentials over Omaha also approved for constructing class rates from New Orleans to Sioux City.

Proposed increased class rates from St. Louis to points in Oklahoma not justified.

### State Commissions

The Railroad Commission of Louisiana has ordered the Louisiana Western to place its line between Salt Mine Junction, La., and Eunice in safe condition for the operation of trains by the replacement of ties, rails and other material within 90 days. A petition was filed with the Commission in September by citizens of Vermilion declaring this portion of the road to be unsafe. The Commission found that the rails are light, worn and badly out of alignment in many places, that the ties have rotted in such numbers as to be a constant cause of derailments and that there is little ballast.

The Board of Railway Commissions for Canada has requested the railway companies subject to its jurisdiction to signify whether they are agreeable to the issuance of a general order extending the application of the commission's General Order 18, relating to the smoke nuisance, to stationary plants and requiring that such stationary plants be equipped so as to prevent unnecessary emission of smoke. This action has been taken as a result of many complaints received concerning the nuisance arising in cities by reason of the smoke emitted from stationary plants of railways.

Position light signals, such as are used extensively on the Pennsylvania Railroad, if substituted for colored light signals, would largely contribute to the prevention of rear collisions. This is the opinion expressed in a statement presented to the Public Service Commission of the State of Pennsylvania by John P. Dohoney, chief of the commission's Bureau of Accidents. Mr. Dohoney gives this view as the judgment of men familiar with signals. He takes the position that "until the practicability of a system of automatic train control can be established, the most advanced method of signaling ought to be provided."

### Court News

#### Railroad's Damages for Right of Way

##### Taken for Highway

The Missouri Supreme Court holds that while, in that State, a railroad over whose right of way a public road has been condemned is entitled to receive compensation for all damages that may be reasonably anticipated and ascertained, it is not entitled to the expense of installing and the cost of maintaining an electric bell at the crossing, such bell being necessary as a safeguard against accidents.—*Franklin County v. Missouri Pacific* (Mo.) 210 S. W. 874.

#### Right of Way—Abandonment

The Supreme Court of the United States has settled the proposition that a railroad company to which a right of way has been granted by the general government cannot alienate any part of it so as to interfere with the full exercise of the franchise granted: *Grand Trunk v. Richardson*, 91 U. S. 454. Applying this rule the Kansas Supreme Court holds that where such a railroad has been granted by act of Congress a right of way 400 feet wide, it cannot be divested of its right thereto by abandonment or by suffering an individual to occupy a part of it for the period of the local statute of limitations.—*Union Pacific v. Thedan* (Kan.) 178 Pac. 441.

## Foreign Railway News

### Institute of Transport

LONDON.

It is announced that Sir Eric Geddes, Minister of Transport, has decided to become first president of the newly recognized Institute of Transport.

### Proposed Electrification of German Railways

LONDON.

The Times Trade Supplement states that electrification of the German railways is being considered by the government, with a view to a reduction of expenditure in their exploitation.

### Dutch Railways Electrification

LONDON.

An abstract from Modern Transport states that it is intended to electrify the sections of the Dutch railway system running between Rotterdam, the Hague, Amsterdam and Amerfoort.

### Italian Passenger Fares Increased

Press despatches report that Italian passenger fares are to be increased 80 per cent for first class, 60 per cent for second, and 50 per cent for third, in order to meet the increased cost of coal and labor.

### Electrification of Brazilian Railways

LONDON.

An abstract from the Times Trade Supplement states that the cost of the electrification of the trunk line from Barra to Pirahy (Brazil) has been placed at £1,166,250, and it is stated that the work will not be completed until 1922.

### Loss on Russian Railways

LONDON.

An abstract from Russian Outlook states that half the locomotives in Soviet Russia need repair. The railway expenditure increased ten times to 7,300,000,000 roubles in 1918. The profit on the railways of 470,000,000 roubles under Czarism has been converted under Bolshevik rule into a loss of 5,500,000,000 roubles.

### Electrification of the Narvik Railway

An article abstracted by the Technical Review from Teknisk Ukeblad states that the line which carries iron ore from Sweden to the ice-free harbor in Norway for transshipment to England, has been electrically worked for some years on part of the Swedish portion, namely, from the ore deposits to Riksgransen on the Norwegian border. Electrification of the line from Lulea to Narvik is now in progress and it is expected that this will be completed early in 1922. A further portion of the Swedish line as far as the Gallivare station will be ready in a few weeks, but further extensions requiring about £950,000 are awaiting the sanction of the Swedish Parliament. The Norwegian portion is expected to be fully electrified by the end of 1921.

### England's Rolling Stock Contracts

LONDON.

The Leeds Forge Company, Limited, has received contracts for 12 all-steel carriages for the Union of South Africa railways, including six-day and sleeping, and six suburban vehicles, all fitted with four-wheeled pressed-steel bogies; 148 bogie 22-ton covered goods wagons for the conveyance of soda traffic over the Magadi sections of the Uganda railways; and 100 pressed-steel underframes and bogies for the refrigerator wagons for the South African railways, the bodies for which are being built in South Africa. These bogies are of the South African Railways' standard pattern, as the vehicles will be used on fast-timed passenger services. Messrs. Cravens Railway Carriage & Wagon Company, Limited, of Darnall, Sheffield, have received an order

for 250 high-sided goods wagons, of 10 tons' capacity, for the Great Northern Railway, and they have also an order for 81 all-steel ballast wagons for the South Indian Railway.

### North British Railway Changes

LONDON.

W. P. Reid, locomotive superintendent of the North British Railway, retired from active service at the end of December. Mr. Reid started his railway career in 1876 under the direction of Dugald Drummond, the then locomotive superintendent of the North British railway, at the Cowlairs works. In 1883 he was placed in charge of the locomotive depot at Balloch, in 1889 he was removed to Dumfermline, in 1891 to Dundee, and in 1900 to the St. Margaret's depot, Edinburgh, which is the second largest locomotive depot on the North British railway system. It was in 1904 that he was made locomotive superintendent of the North British railway.

Owing to the retirement of W. P. Reid, the position of locomotive superintendent will be divided, and Walter Chalmers, the present chief draughtsman at the Cowlairs Works, Glasgow, will become chief mechanical engineer with charge of all workshops and dock machinery, while the position of locomotive running superintendent will be taken by John P. Grassick, at present district locomotive superintendent at the Eastfield Depot. The headquarters will be at Cowlairs, Glasgow.

### Shortage of Freight Cars in Great Britain

The dearth of railway wagons, which is leading to general complaints by traders, has been accentuated to some extent by the increased consignments of merchandise for the Christmas trade, says an article in a recent issue of the Times (London).

The scarcity of wagons is real, the Times says, and is likely to continue. To a very large extent this is attributed to the attitude of the government toward the railways. With the nationalization of the railways still not a very remote possibility, the railway companies are staying their hands, and, while they are making and ordering wagons, the bulk of their work in this direction is being devoted to repairs.

There is a standard clause in most of the Railway Companies' Acts that they are not to be called on to furnish wagons, for certain traffic, and neither the Ministry of Transport nor the Railway Executive Committee have the power to force the companies to provide more wagons. The railway companies have a very full programme of work, but they are not likely to embark on any large capital outlay until they have a better idea of what the future has in store.

The situation is still further complicated by the fact that the readjustment of railway rates, which is inevitable, is expected to do much to relieve the present congestion. The railway rates now are so favorable that traders are not prepared to consider other methods of forwarding their goods, but when the necessary readjustment is made coastal shipping will resume its proper place in our transport service. In railway circles it is believed that when that readjustment takes place the number of wagons now available, with those under repair, will be more than ample.

So far as privately-owned wagons are concerned, and of these there are 700,000, traders are in no hurry to increase the number. For this, again, the blame is laid at the door of the government. On the second reading of the Transport Bill Sir Eric Geddes stated that, if the Bill passed, one of the first acts of the government would be to acquire the private wagons on fair terms, and private owners not unnaturally see no prospect of useful capital expenditures in the acquisition of further wagons. From the beginning of the year to September 30, 8,480 wagons were constructed for the railway companies, and orders have been placed, mainly with the companies' own shops, for a further 22,600.

There are three main directions in which relief is expected on the railways. The first is the readjustment of the railway rates, which will enable other forms of transport to compete on even more equal terms; the second is the more speedy unloading of wagons and a greater realization of the national need, which will lead to a reduction in the number of wagons used as warehouses; and the third is an acceleration of work by the railwaymen.



## Equipment and Supplies

### Locomotives

THE BELGIAN GOVERNMENT has divided equally an order for 150 Consolidation type locomotives between the American Locomotive Company and the Baldwin Locomotive Works; an additional 200 locomotives will probably be placed with English builders. These locomotives will be equipped with superheaters and will have bar frames. The total weight in working order will be 186,000 lb. and on the drivers 164,000 lb. They will have 24 in. by 28 in. cylinders and 60 in. driving wheels, and will be of standard gage. In an unconfirmed report in our issue of December, page 1218, it was stated that 660 locomotives were ordered from the above companies.

### Freight Cars

THE UNION PACIFIC is asking for prices on 3,000 40-ton capacity refrigerator cars.

THE SINCLAIR REFINING COMPANY, Chicago, is inquiring for 40 tank cars of 10,000 gal. capacity.

THE MISSOURI, KANSAS & TEXAS has ordered 300 tank cars from the American Car & Foundry Company.

F. A. PEASE, Chicago, has ordered 50 8,050 gal. capacity tank cars from the Pennsylvania Tank Car Company.

JOHN R. WALSH, Savannah, Ga., has ordered 3, 8,050 gal. capacity tank cars from the Pennsylvania Tank Car Company.

THE GLEN NINA TANK LINE, Buffalo, N. Y., has ordered 50 8,050 gal. capacity tank cars from the Pennsylvania Tank Car Company.

THE FRANKLIN QUALITY REFINING COMPANY, Franklin, Pa., has ordered 10 8,050 gal. tank cars from the Pennsylvania Tank Car Company.

THE SLOSS-SHEFFIELD STEEL & IRON COMPANY, Birmingham, Ala., has ordered 25 coke cars of 50 tons capacity from the Pressed Steel Car Company.

THE CHESAPEAKE & OHIO is in the market for 1,000 gondola cars; this is in addition to the inquiry for 1,000 hopper car bodies reported in our issue of November 28.

THE BIGHEART PRODUCING & REFINING COMPANY, Tulsa, Okla., has ordered 100, 8,050 gal. and 100 10,050 gal. capacity tank cars from the Pennsylvania Tank Car Company.

THE KEYSTONE ENGINEERING COMPANY, New York, is inquiring for 30 all steel box cars of 30 tons capacity and 300 single sheathed box cars of 30 tons capacity for export to China.

THE ANN ARBOR, reported in the *Railway Age* of December 5, as inquiring for 100 to 200 U. S. R. A. standard single sheathed box cars, has arranged to accept this equipment from the Railroad Administration.

The Brotherhood of Dining Car Conductors held its first national convention in Chicago the third week in December. Over 50 delegates, including J. A. Hennessey, national president, and other grand lodge officers, were present. The brotherhood was founded in January, 1918. The convention took up the question of the revision of the constitution and by-laws and the election of officers. The brotherhood is not associated with the American Federation of Labor. Its object, according to C. A. Clark, chairman of the general grievance committee, is co-operation with the different managements in an endeavor to raise the standard of dining car service to a higher plane. The decisions of the conference were not made public.

## Supply Trade News

The Ross Manufacturing Company, Cleveland, Ohio, has recently moved into its new plant at 3160 West 106th street.

C. A. Pinyerd, supervisor in the Chicago office of the Safety Car Heating & Lighting Company, New York City, has been appointed sales representative with the same headquarters.

Hugo L. Siegel, formerly general sales manager for the Ford Roofing Products Company, is now with the Walter A. Zelnicker Supply Company, St. Louis, Mo., as assistant to the president.

Hal. R. Stafford, who has been chief engineer of the Franklin Railway Supply Company, Inc., since this company took over the Economy Devices Corporation, died at his home in Plainfield, N. J., on December 9.

William A. Benson, formerly associated with the Adams & Westlake Company, Chicago, has been appointed assistant manager of sales in the Chicago district for the Hanna Locomotive Stoker Company, Cincinnati, Ohio.

Manning, Maxwell & Moore, New York City, owners of the Shaw Crane Company, Muskegan, Mich., will build a plant in the latter city at a cost of \$2,000,000 for the manufacture of machine tools and other equipment.

E. A. Woodworth, secretary of the Committee on Mechanical Standards of the United States Railroad Administration, has resigned to become special representative for the Chicago Pneumatic Tool Company, with office at Chicago.

The Paxton & Vierling Iron Works, Omaha, Neb., has acquired the business formerly conducted by the Hoeschen Manufacturing Company, of the same city, and will continue to manufacture the Hoeschen bells and track instruments.

The St. Louis Machine Tool Company is building an addition to its plant at St. Louis, Mo., which will add about 13,000 sq. ft. to the floor space and practically double the capacity for the manufacture of grinding, polishing and tapping machines.

Joseph E. Nelson & Sons, engineers, Chicago, have opened a branch office at Kansas City, Mo., in charge of D. C. Dugger. Mr. Dugger, who has been mechanical engineer at the Chicago office, will have his Kansas City headquarters in the Kansas City Life building.

A. B. Lacy, purchasing agent of the Virginian Railroad, has resigned to become vice-president of M. T. Blassingham & Co., Inc., Norfolk, Va. This company handles pine, oak and fir lumber for railroads and contractors; and cross ties for steam, electric and industrial properties.

The Louisiana Steel Company has been chartered at Shreveport, La., with a capital of \$10,000,000, to build a steel plant in connection with the development of 7,000 acres of iron ore in Cass, Marion and Upshur counties, La. The incorporators are L. T. Weatherstone, Beaumont, Tex.; J. Niblett, Hughes Springs, Tex., and Fox Winnie, Newton, Kans.

The Schaefer Equipment Company, Pittsburgh, Pa., manufacturers of railway materials, has recently completed arrangements with the International Equipment Company, Ltd., Montreal, Quebec, E. G. Jackson, president, to handle its manufactures and sales in Canada.

I. F. Baker, of the Westinghouse Electric International Company, who has been located in the New York office of that company for the past two years, is now on his way to Tokio, Japan, where he will act as a special representative of the Westinghouse International Company. Mr. Baker entered the graduate student course about 1908, later serving in various capacities in the resale and contract sections of

foreign department, which later became the Westinghouse sales department. In 1913 he was transferred to the Electric International Company.

Owing to the rapidly increasing use of the American stay-bolt and the reduced body staybolts by the railroads and industrials of this country, **Benson & Co.**, with general offices at 50 Church street, New York City, has been organized to promote the sales and service of the American Flexible Bolt Company products. **R. W. Benson**, general sales manager, is president of the new company. Both companies will maintain engineering service organizations to study locomotive boiler staybolt problems and aid in their solution.

**Frank O. Wells**, president of the **Greenfield Tap & Die Corporation**, and one of the prominent figures in the screw thread industry in the United States, has sold his entire holdings to **Frederick H. Payne**, vice-president. Mr. Wells retires as president and member of the board of directors and Mr. Payne has been elected president in his place. **F. G. Echols**, vice-president and general manager, has been elected a director of the corporation to fill the vacancy caused by the resignation of Mr. Wells, but Mr. Wells will remain with the corporation in an advisory capacity.

**Arthur W. Wheatley**, who was elected president of **Armstrong Whitworth (of Canada), Ltd.**, in November of this year, is now in full control and direction of the Longueuil works. The works have, since their inception, been engaged in the manufacture of tool steels, small tools, railway tires, etc., and with the cessation of hostilities, the policy and energies of the firm were directed toward the further development of their products, especially of railway material for which there is a heavy demand. It is proposed also, to develop the manufacture of the all steel wheels for rolling stock.

**The Reading Iron Company**, Reading, Pa., has acquired the plant of the **E. & C. Brooks Iron Company**, Birdsboro, Pa. This property adds to the manufacturing equipment of the Reading Iron Company 16 double puddling furnaces, with a three-high double muck mill, a 24-inch three-high skelp mill with four heating furnaces, a nail factory of 75 nail machines, and the company's skelp capacity is increased by 2,800 tons per month, with a corresponding increase in the production of finished wrought iron pipe. Through the acquisition of the **George B. Lessig Company** plant at Pottstown, Pa., last October, the Reading Iron Company secured an additional muck bar capacity of 2,600 tons per month.

**The Gustin-Bacon Manufacturing Company**, Kansas City, Mo., has purchased all machinery and equipment formerly used by the **Emery Pneumatic Lubricant Company**, of St. Louis, Mo., and has also acquired the exclusive rights to the manufacture and sale of the **Emery brake cylinder lubricant**. **E. A. Emery**, the originator of the **Emery brake cylinder lubricant** formula, has become associated with the **Gustin-Bacon Manufacturing Company** and has direct charge over the manufacture of this product. Due to certain essential ingredients being required for government use during the war period, the manufacturers of **Emery brake cylinder lubricant** was discontinued; but since these ingredients are again obtainable, the **Gustin-Bacon Company** is now manufacturing the lubricant.

**The American Steam Conveyor Corporation**, Chicago, announces that the **Atlas Machinery & Supply Company** is now handling the sale of the American steam ash conveyor in its St. Louis territory. This company has offices at 1416 Syndicate Trust building, St. Louis, Mo., and is a new sales organization in that vicinity. It is headed by **Wm. H. Patton**, who recently returned to the United States after two years' service in the army. Associated with Mr. Patton is his brother, **W. R. Patton**, who for the past 20 years has traveled the central west, engaged in the sale of power plant equipment. During the past four years he has represented several large manufacturers as district manager. **N. B. Stewart**, who has been identified with the power plant machinery business at St. Louis for 25 years, has also associated himself with this company.

## Railway Officers

### Railroad Administration

#### Operating

**W. T. Peyton**, terminal manager of the Ft. Worth Belt, with office at Fort Worth, Tex., who has formerly reported to the federal manager, will hereafter report to **J. A. Somerville**, general manager of the Texas & Pacific.

**G. E. Passage**, traveling engineer of the Chicago, Milwaukee & St. Paul, with headquarters at Chicago, has been appointed trainmaster of the Illinois division at Savanna, Ill. **Andrew J. Dutton** has been appointed trainmaster of the Des Moines division at Des Moines, Iowa.

#### Traffic

**A. D. Grant**, traveling freight agent of the Union Pacific, with headquarters at Omaha, Neb., has been appointed general agent at Lincoln, Neb., succeeding **A. R. Hall**, who has resigned.

**James G. Carlisle**, assistant freight traffic manager of the Central of Georgia, has resigned to become connected with the sales department of the **Bibb Manufacturing Company**, cotton mills, at Macon, Ga.

**Fred Zimmerman**, traffic assistant to the terminal manager of the Northwestern region, with office at Chicago, has resumed his position as vice-president of the Chicago, Indianapolis & Louisville, with the same headquarters.

**F. C. Reilly**, general freight agent of the St. Louis-San Francisco, with headquarters at St. Louis, Mo., has resigned to become vice-president of the **W. L. Zelnicker Supply Company**, and **S. S. Butler**, assistant general freight agent, has been appointed his successor. **Robert N. Nash** has succeeded Mr. Butler.

**H. B. Tooker**, general freight and passenger agent of the Bingham & Garfield and the Ray & Gila Valley, with office at Salt Lake City, Utah, has been appointed traffic manager of both companies with the same headquarters. Mr. Tooker has also been appointed traffic manager of the Nevada Northern, with headquarters at Salt Lake City. On January 1, 1920, he will become traffic manager for various mining companies under the general management of **D. C. Jackling**, Salt Lake City.

#### Purchasing

**A. B. Lacy**, purchasing agent of the Virginian, has resigned to become vice-president of **M. T. Blassingham & Company, Inc.**, Norfolk, Va. **Tom Moore**, general storekeeper at Princeton, W. Va., has been appointed Mr. Lacy's successor and **D. C. King** succeeds Mr. Moore.

### Corporate

#### Traffic

**H. B. Tooker**, general freight and passenger agent of the Bingham & Garfield and the Ray & Gila Valley, with headquarters at Salt Lake City, Utah, has been appointed traffic manager of those roads and the Nevada Northern, with headquarters at San Francisco.

**C. T. Bradford**, assistant traffic manager of the Deering Southwestern, the Illinois Northern, the Chicago, West Pullman & Southern and the Owasco River, industrial roads subsidiary to the International Harvester Company, Chicago, has been appointed traffic manager of the harvester company and president and general manager of the above named roads, succeeding **Frank B. Montgomery**, whose death was announced in the *Railway Age* of October 17.